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July 10, 1966

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

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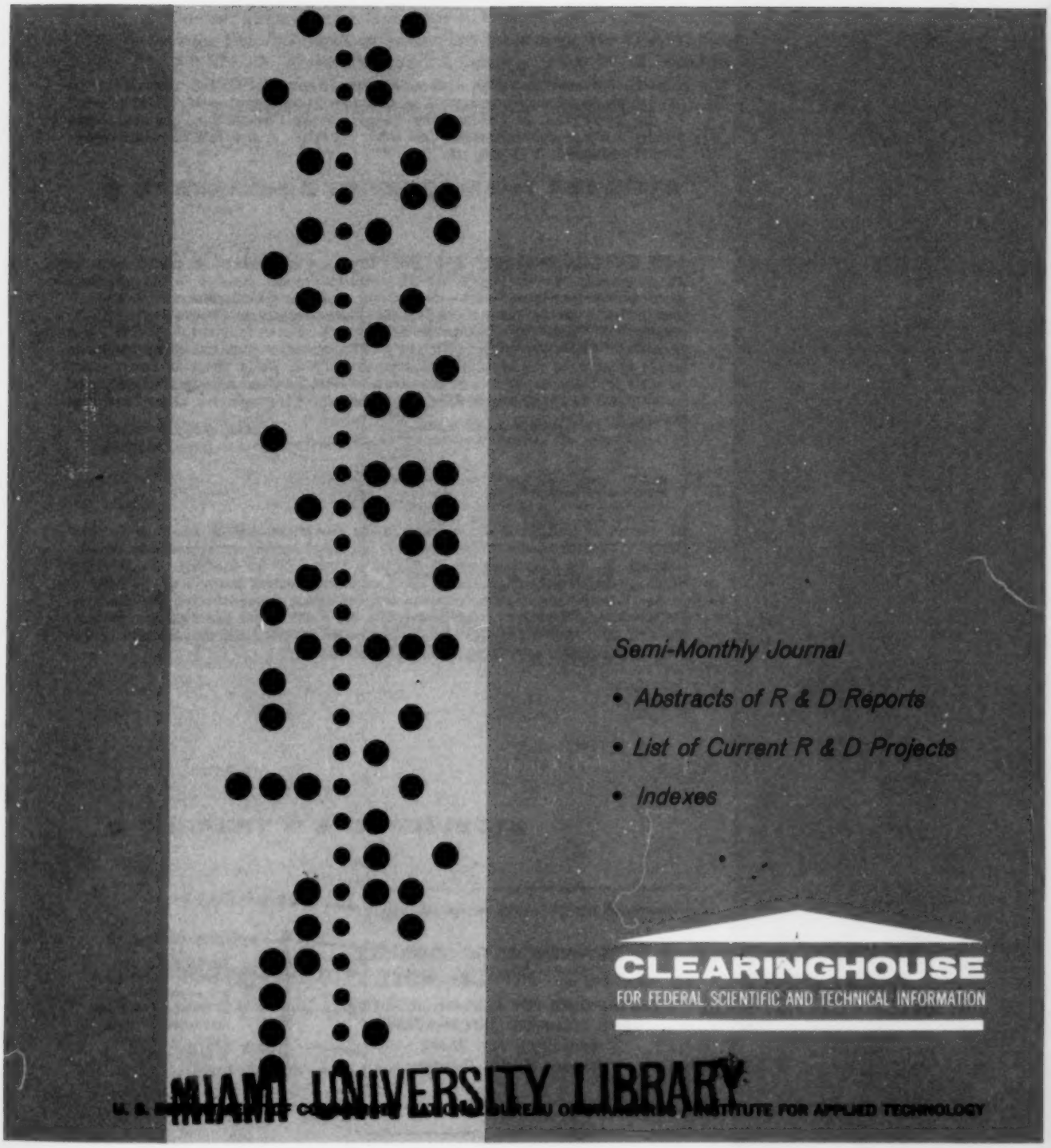

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*
- *Indexes*

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July 10, 1966 / Volume 41, Number 13

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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PURPOSE

U.S. Government Research & Development Reports (USGRDR) announces the availability of selected new reports of U.S. Government-sponsored R & D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies. It also lists current Government-sponsored R & D projects.

TO ORDER REPORTS

With few exceptions, reports announced herein are available to the public from the Clearinghouse. Order reports by the accession/report number (stock number) given on the first line of each entry. Order from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Department of Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche (MF) are given in the entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Make check or money order payable to National Bureau of Standards—CFSTI. When reports are announced as available from an organization other than the Clearinghouse, order from that source.

INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $1.75. Indexing data from recent issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

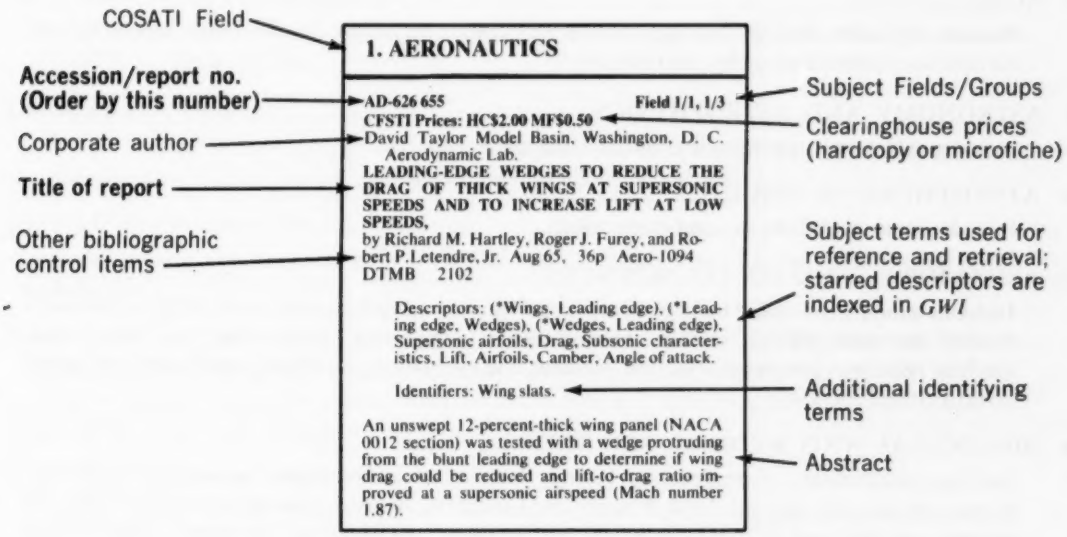
CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 22, 1966.

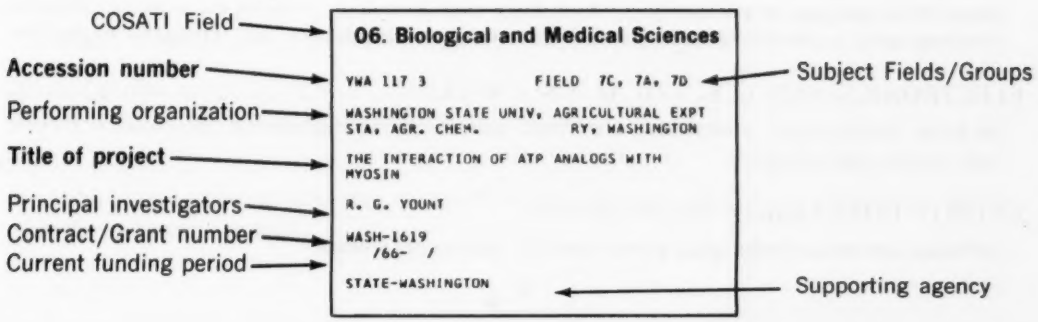
USGRDR FORMAT

Entries are arranged under 22 subject categories called FIELDS. In the entry, subcategories called GROUPS and occasionally sub-groupings are also indicated. This system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The COSATI Subject Category List, AD 612 200, is available from the Clearinghouse at $1.00. Documents are listed alphanumerically (that is, alphabetic data precedes numerical data) by accession/report number. Key segments of information contained in the entries are identified diagrammatically below.

● RESEARCH & DEVELOPMENT REPORTS


COSATI Field
1. AERONAUTICS
Accession/report no. (Order by this number)
AD-626 655
Field 1/1, 1/3
Subject Fields/Groups
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse prices (hardcopy or microfiche)
Corporate author
David Taylor Model Basin, Washington, D. C. Aerodynamic Lab.
Title of report
LEADING-EDGE WEDGES TO REDUCE THE DRAG OF THICK WINGS AT SUPERSONIC SPEEDS AND TO INCREASE LIFT AT LOW SPEEDS,
by Richard M. Hartley, Roger J. Furey, and Robert P. Letendre, Jr. Aug 65, 36p Aero-1094 DTMB 2102
Other bibliographic control items
Descriptors: (*Wings, Leading edge), (*Leading edge, Wedges), (*Wedges, Leading edge), Supersonic airfoils, Drag, Subsonic characteristics, Lift, Airfoils, Camber, Angle of attack.
Subject terms used for reference and retrieval; starred descriptors are indexed in GWI
Identifiers: Wing slats.
Additional identifying terms
An unswept 12-percent-thick wing panel (NACA 0012 section) was tested with a wedge protruding from the blunt leading edge to determine if wing drag could be reduced and lift-to-drag ratio improved at a supersonic airspeed (Mach number 1.87).
Abstract

● CURRENT R & D PROJECTS



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SUBJECT CATEGORY HEADINGS

COSATI FIELD

01 AERONAUTICS 1
Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 3
Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 3
Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 4
Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 9
Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 41
Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

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08 EARTH SCIENCES AND OCEANOGRAPHY 55
Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 61
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10 ENERGY CONVERSION (Non-Propulsive) 70
Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

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11 MATERIALS 71
Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 79
Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 82
Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 87
Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 89
Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 91
Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 91
Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 94
Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE 100
Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 102
Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 120
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22 SPACE TECHNOLOGY 122
Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

NOTICE

Beginning with this issue of USGRDR, the white and blue reports sections have been merged into one section. This merger eliminates the necessity of searching two sections to locate material in a particular field. Computer programs used in the production of the USGRDR on Linofilm make this consolidated journal possible. At the same time, the GWI will be published twice a month instead of once a month. GWI will be coordinated with each issue of USGRDR so that it will serve as an index to USGRDR.

RESEARCH highlights

Reports of current high industrial interest

Categories

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Data Processing

DIGITAL COMPUTER PROGRAMMED AS ANALOG

(Order Stock No. IS-1225 DIAN--A System for Programming a Digital Computer in Terms of Analog Components, HC $3.00/MF $0.75.)

DIAN (DIgital-ANalog) is a programming system by which a digital computer may be programmed in a manner very similar to the technique of programming an analog computer. A manual prepared by Iowa State University, where the system was developed, indicates that in using DIAN, the programmer need be concerned only with the relationships between inputs and outputs of basic computational components which perform specific mathematical operations. The system is compatible with FORTRAN symbolic language and may be used as part of a larger digital computer program. It may be applied to the more general types of boundary-value problems arising in process simulation, to the initial value problems ordinarily solved on analog computers, to nonlinear problems, and to control problems involving large transport delays. The system may be used to simulate a very large analog computer or it may be considered to be a separate technique of problem solution with its own unique features.

Electrical

RADICALLY NEW D. C. BATTERY GIVES PULSATING CURRENT

(Order Stock No. AD-632 103 Direct Production of Electrical Pulses From Galvanic Cells, Part II, HC $1.00/MF $0.50; earlier work is AD-611 748, same title, Part I, HC $2.00/MF $0.50.)

A radically new d.c. battery that gives pulsating current and has potential application as a pure power source in such devices as a heart pacemaker and an integrated power source in electronic circuits has been developed by Fort Monmouth engineers. The Army emphasizes that it is strictly a d.c. battery, but it is also the closest thing yet to an a.c. battery because the current is delivered in oscillations characterized by amplitude, wave form, and frequency. The experimental model is about the size of two standard flashlight batteries. It has a power output of 0.5 watt, a voltage of about 0.8, and a current of about 400 milliamperes. Army engineers say further miniaturization with higher wattage and voltage may be possible. Thus far, the battery has flashed a lamp at a frequency as high as 15 cps. The heart pacemaker is only one of many devices that require pulsation, and other potential applications may appear as the device is further engineered. If the oscillations can be built up to 50 cps in future Army work, direct transformation to a. c. current is possible.

Engineering and Construction

LOADS ON TIMBER BRIDGES STUDIED

(Order Stock No. PB-169 114 Distribution of Wheel Loads on Timber Bridges, HC $3.00/MF $0.75.)

U. S. Forest Products Laboratory conducted a study of the placement and distribution of concentrated live-loads from truck wheels on timber bridges. Design stress criteria of AASHO (American Association of State Highway Officials) Standard Specifications for highway bridges were found to be over-conservative for maximum stringer shear but adequate for bending moment. Using bridge decks assembled and loaded under controlled laboratory conditions, the FPL also found: destructive tests indicate a questionable margin of safety between working stress and ultimate strength; observations of the stringers show the need for careful grading of bridge timbers, particularly with respect to slope of grain; good agreement between the total distributed end reactions and the calculated end reaction from the applied loads. With respect to load distribution, results of both laboratory-controlled and field-loading studies indicate: the present AASHO specification for load distribution to interior stringers for maximum bending moment is considered adequate without change, but for maximum external shear it is much too conservative; experimental data do not indicate any need to change the present design criteria for outside stringers.

NATIVE SOILS TESTED FOR CEMENT MIXES

(Order Stock No. PB-169 432 The Effect of Delayed Compaction on Stabilized Soil-Cement, HC $4.00/MF $0.75.)

Tests of 10 native soils used in cement mixes indicate that each soil showed different patterns of behavior as to compressive strength, durability, and density within the first two hours of the compaction period. This conclusion is based on a study made by the Division of Engineering Research, Louisiana State University, which says that one given pattern of behavior of all variables for all soil-cement mixes does not exist. The study was made to look into the behavior of soil-cement mixes when a delay between the time of mixing and compaction is introduced--a delay which, under normal conditions, takes from two to four hours after mixing the soil with the cement. The loss of compressive strength, durability, and density due to this delayed compaction can become so great in intensity that any physical improvements to be derived from the addition of portland cement to the mix are nullified. In addition, the LSU study indicates a considerable and uniform decrease in durability, compressive strength, and density of soil-cement mixes compacted at, below, or above their optimum cement and moisture contents, and after a delay of two hours or more in compaction of the soil-cement after mixing. Since a delay between mixing and compaction cannot be avoided, LSU engineers offer steps that should be taken to counteract the detrimental effects of delayed compaction. When the delay exceeds the specified limits, the following methods may be used to compensate for losses: (1) Increase the thickness of the base to enable it to carry a specified load; (2) Use set-retarding agents such as calcium lignosulfonate and hydroxylated carboxylic acid in trace amounts to slow down the cementation process (the most economical method); and (3) If economically feasible, use plant-mixed soil-cement which can be delivered and compacted in a period of time not exceeding 0.80 times the initial setting time of the cement as determined by the ASTM Designation: C266-64.

SHELL BUCKLING PROBED IN DEPTH

(Order Stock No. AD-631 508 The Perplexing Behavior of Thin Circular Cylindrical Shells in Axial Compression, HC $9.60/MF $0.75.)

The von Karman theory of buckling load, his explanation of the snap-through type of buckling of thin shells subjected to compression, the existence of equilibrium states corresponding to large deformations of the compressed shell which are responsible for the low experimental values obtained and for the perplexing behavior of the shell when it buckles--these are discussed in a report prepared by Stanford University. The report discusses the development of the classical buckling formula, criticism of the classical results, new solutions of the classical equations, and the discoveries of von Karman and his collaborators. It extends to the Yoshimura buckling pattern, further development of the large-displacement theory, the effect of prebuckling deformations, the Koiter theory, and a brief chronology of experimental verification by specialists in buckling theories.

FOREIGN INFORMATION PROGRAMS SURVEYED

(Order Stock No. PB-169 662 Compendium of Foreign Programs, HC $2.00/MF $0.50.)

Compendium of Foreign Programs, the first publication issued by the Office of State Technical Services to aid State planners in implementing the 1965 State Technical Services Act, surveys the services and programs of 13 countries disseminating technical information to their industries. The document also describes the activities of the Organization for Economic Cooperation and Development that contribute to the exchange of scientific and technical information. Most of the countries covered in the survey have an advanced technological base, with a preponderance of medium and small firms, and a fully operational program of cooperation between Government, industry, universities, and semi-official organizations. The countries covered are Canada, Denmark, France, Israel, Japan, Netherlands, Norway, Sweden, United Kingdom, Federal Republic of Germany, Austria, Belgium, and Italy.

FOREIGN INVESTMENT STUDIES AVAILABLE FROM CLEARINGHOUSE

Industry Profiles, a series of publications of special value to United States firms contemplating investment in the underdeveloped countries, are now available from the Clearinghouse. Prepared by the Agency for International Development, the publications give basic information on a small- or medium-sized plant in a specific industry. They discuss succinctly the features of the industry and its marketing problems and show the approximate amount of capital needed to establish a plant of specified capacity. Each Industry Profile also gives an estimate of the annual costs, by categories, of running the plant at full capacity. It provides a plant layout and reference information on technical journals, articles, books, patents and the like. By examining the Profiles for the industries in which they are interested, potential investors can take the initial step in the process of deciding whether to embark on particular projects. The Profiles are not a substitute for full-scale feasibility studies by experts that should precede the actual establishment of new plants. They indicate the major factors to be considered in making such studies, however, and they provide a systematic guide for making cost estimates applicable to local conditions.

Copies of individual Profiles are $1.00 each. A subscription service through which all Industry Profiles may be received as they are produced (about 250 in 1966) is available at a cost of $200. A free list of the 150 now completed can be ordered from Clearinghouse for Federal Scientific and Technical Information, 410.14, U. S. Department of Commerce, Springfield, Va. 22151.

Metalworking and Metal Forming

BATTELLE METALWORKING REPORTS REISSUED

The following reports were prepared by Battelle Memorial Institute in a joint effort of NASA and the Department of the Army through the Redstone Scientific Information Center. Because they report important advances that are applicable to many segments of U. S. industry and to contemporary technology, the reports have been reissued and are again available from the Clearinghouse.

(Order Stock No. AD-620 508 Machining and Grinding of Titanium and Its Alloys HC $2.00/MF $1.00.)

This manual is a state-of-the-art review that describes the methods currently employed for conventional machining, grinding, electrolytic, and chemical machining processes. It points out the precautions which should be taken to avoid troubles resulting from the characteristics of titanium, and discusses 10 machining, 2 grinding, 2 cutting, and 2 unconventional metal-removal operations. Other sections discuss the mechanics of chip-forming processes, the response to machining variables, costs, and safety precautions. Problems in machining titanium, Battelle notes, originate from three basic sources: high cutting temperatures, chemical reactions with tools, and a relatively low modulus of elasticity. These difficulties can be minimized by following recommendations given in the manual, the information for which was obtained from equipment manufacturers, technical publications, reports on Government contracts, and discussions with engineers employed by major aircraft companies.

(Order Stock No. AD-620 509 Adhesive Bonding of Titanium and Its Alloys, HC $2.00/MF $0.75.)

This state-of-the-art report is oriented toward the interests of the designer and the manufacturing engineer. It describes typical joint designs, surface preparation procedures, types of adhesives used for bonding, environmental factors as they influence choice among available adhesives, processing techniques, representative applications of adhesive bonding, and available test results on adhesive-bonded titanium alloys. Battelle notes that titanium alloys have been competitive structural materials since only about 1954, and since then almost the entire technology of titanium has had to be developed. Their report is the result of an intensive literature search that began with 1957, but pre-1957 references are included where appropriate. Information sources were the Battelle Library, Defense Metals Information Center, Redstone Scientific Information Center, Defense Documentation Center, and Plastics Technical Evaluation Center.

(Order Stock No. AD-464 680 Survey of Electroforming for Fabricating Structures, HC only, $1.00.)

To determine the advantages, scope, and limitations of electroforming as a practical and economical method for fabricating structures, Battelle has collaborated with several commercial sources for the electroforming of nickel with ultimate tensile strengths of 90,000 to 100,000 psi, or more. Although tough (notch insensitive), 200,000-psi nickel has been electroformed, additional informa-

tion must be developed before such a high strength material can be electroformed consistently in a complexly shaped form. The Battelle report describes advantages and limitations of electroforming, summarizes available property data of materials, and discusses electroforming conditions that must be maintained for good control of structural properties. It covers physical factors such as fatigue, stress, permeability, and density associated with metals used in production techniques; specifications and tests for the end products; important factors for the control of properties of electroformed structures; commercial sources and their production capabilities; and production cost considerations.

(Order Stock No. AD-461 825 The Processing and Properties of Hastelloy C, HC only, $1.00.)

This nickel-base alloy has unusually good-corrosion resistance and excellent oxidation properties to at least 2000°F. The report brings together under one cover a variety of information on processing and metalworking, including phase relationships, hardening mechanism, physical and mechanical properties, melting procedures, primary fabrication procedures, bending, machining, and joining. Cleaning procedures include degreasing, descaling, light pickling; heat-treating includes time-temperature-cooling rate and type of furnace atmosphere. Data on corrosion cover corrosion resistance in moist salt air and oxidation resistance, and there is a section on fatigue behavior. A final section on mechanical properties gives tables with data on ultimate tensile strength, yield strength, percent elongation, reduction in area, rupture stress in 100 hours and 1000 hours, and hardness. Sources used for preparation of the report were the primary producer of Hastelloy C, Union Carbide Corporation (Stellite Division, Kokomo, Ind.), for processing and property information; nine separate processors for shop practice information; technical papers published since 1955; reports on Government projects as contained in the files of the Defense Metals Information Center; and information from Volume 2 of the ASM Metals Handbook.

(Order Stock No. AD-455 069 Thermal Properties of High-Temperature Materials, HC only, $3.50.)

This study gives the thermal properties of a wide variety of metals and metal alloys, ceramics, and cermets and composites. Specific heat, thermal conductivity, and thermal expansion data are plotted on separate graphs for materials which have possible structural usefulness above 2500°F. Tables below each graph identify the data-point symbols used according to reference numbers and investigator. Notations concerning test method, material composition, and any pertinent remarks are included. Battelle obtained applicable references (3000 were screened) from either the Redstone Scientific Information Center, the Battelle Library, or the Defense Metals Information Center, after searching technical literature indexes to locate applicable publications. The report also lists 32 prominent laboratories and investigators currently making thermal property measurements.

(Order Stock No. AD-603 694 Design, Performance, Fabrication, and Material Considerations for High-Pressure Vessels, HC $2.75/MF $1.25.)

This survey provides a background for the selection and application of ground-based and airborne tanks and bottles for liquids and gases to 5000 psi and above, and for both low and ambient temperature applications. The survey includes the

design, performance, fabrication, and material considerations for single-walled, multilayered, and banded pressure vessels. It treats structural safety, reliability, and welding processes, plus material considerations of mild steels, alloy steels, titanium alloys, and aluminum alloys used in vessel fabrication. In addition, it discusses and analyzes test procedures, and fracture initiation and propagation. Battelle's information sources were the National Space Agency, the Redstone Science Information Center, the Battelle Library, and the Defense Metals Information Center.

Nuclear Technology

AEC RELEASES PAPERS ON ISOTOPES AND INDUSTRIAL TECHNOLOGY

(Order Stock No. CONF-651206 Isotope Systems Development Program Seventh Annual Contractors Meeting, HC $3.00/MF $0.75.)

Thirty-eight papers presented at the Annual Contractors Meeting of the AEC's Isotope Systems Development Program have been published. Held at Washington, D. C., Dec. 6-8, 1965, this 7th annual meeting provided an opportunity for a formal review of the progress made in a program that was initiated by the AEC in 1958 with the objective of accelerating the development of new principles and techniques for using isotopes, with particular emphasis on public benefit problems. One paper describes mineral exploration and soil analysis using neutron activation with emphasis on a silver ore detector. Another reviews nuclear techniques as applied to marine mineral technology. Another describes a radioisotope technique for monitoring sediment concentration in rivers and streams. And a paper by the Internal Revenue Service describes progress by that agency in its use of neutron activation analysis in criminalistics. Because of the growing interest in this technique, the I. R. S., Food and Drug Administration, Post Office Department, U. S. Geological Survey, and F.B.I. have contracted with the Naval Research Laboratory to purchase neutrons.

ISOTOPE PURCHASERS LISTED BY AEC

(Order Stock No. ORNL-11C-6 List of AEC Radioisotope Customers With Summary of Radioisotope Shipments, HC $3.00/MF $0.75.)

The Oak Ridge Isotopes Information Center has published a list of AEC customers with a summary of shipments for FY 1965. Listed are the names and addresses of 811 domestic and foreign customers and the particular radioisotopes purchased. Another section of the publication lists each radioisotope from americium-24 to zirconium-95, cross-referenced to the customer-user, plus users of cyclotron service irradiations, reactor service irradiations, and special services. There is also an alphabetical list of states and countries, cross-referenced to customers.

RESEARCH & DEVELOPMENT REPORTS

1A. AERODYNAMICS

AD-632 777 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
WIND-TUNNEL INVESTIGATION OF THE HOVERING, TRANSITION, AND CRUISING PERFORMANCE OF AN ARRESTED ROTOR (TRIDENT) VTOL AIRCRAFT CONCEPT.
Final rept.,
by Gary W. Brasseur and William B. Maguire.
Feb 66, 43p Aero-1101
Proj. 632-542
DTMB 2172

Descriptors: (*Vertical take-off planes, Performance (Engineering)), Hovering, Rotary wings, Model tests, Aerodynamic characteristics, Wings, Flight testing.

Wind-tunnel tests were conducted to evaluate static stability and control characteristics with emphasis on determining the magnitude of transition problems. Evaluating the compatibility of the competing internal and external aerodynamic requirements for high static lift and efficient cruising was an additional test objective. Test results show that the model exhibits a strong directional trim shift through transition. The pattern selected for rotor arrestment during evaluation of the transition characteristics was not acceptable on the basis of power required to support vehicle weight or control of trajectory. The results further indicated that the performance potential of the ducted rotor-nozzle system may be limited because of the structural requirements. Model rotor duct design, from the standpoint of internal aerodynamics, was compromised by adding structure to accommodate the wing bending loads for high-speed cruising. (Author)

N66-11629 **Field 1A, 20A**
CFSTI Prices: HC$3.00 MF$0.75
Advisory Group for Aeronautical Research and Development, Paris (France).
MECHANISM OF NOISE GENERATION IN THE TURBULENT BOUNDARY LAYER,
by John Laufer, John E. Ffowcs Williams, and Stephen Childress. Nov 64, 87p AGARDograph-90

Descriptors: (*Turbulent boundary layer, Noise).

N66-15429 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
THEORETICAL PRESSURE DISTRIBUTIONS ON A SERIES OF SUPERSONIC WING-BODY COMBINATIONS. PART III. DELTA WING RESULTS M EQUALS,
by Y. Y. Chan. 1961, 29p WRE-TM-HSA-87

Descriptors: *Circular cylinder, *Pressure distribu tion, *Delta wing, *Mach number.

N66-15467 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Von Karman Inst. for Fluid Dynamics, Rhode Saint-Genese (Belgium).
LATERAL BLOWING FROM THE TIP OF A LOW ASPECT RATIO WING,
by O. W. Hoiby and J. A. Van der Bliek. Feb 65, 28p VKI-TN-25

Descriptors: *Fluid mechanics, *Pressure distribu tion, *Lift distribution, *Low aspect ratio wing, *Rectangular wing.

N66-15735 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
Oxford Univ. (England). Dept. of Engineering Science.
THE MEASUREMENT OF SKIN FRICTION IN SUPERSONIC FLOW BY MEANS OF HEATED THIN FILM GAUGES,
by B. J. Belhouse, and D. L. Schultz. Oct 65, 19p Rept. no. 1002

Descriptors: *Compressible flow, *Skin friction, *Platinum, *Supersonic flow, *Thin film.

N66-17446 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Aeronautical Research Council, London (England).
ON THE CALCULATION OF CASCADE FLOWS,
by W. S. Hall, and B. Thwaites. 1965, 79p ARC-CP-806, ARC-25350

Descriptors: *Cascade flow, *Incompressible flow, *Inviscid flow, *Flow field, *Fluid mechanics.

N66-18331 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECTS OF MOMENTUM BUFFER REGION ON COAXIAL FLOW OF DISSIMILAR FLUIDS,
by R. G. Ragsdale. 1965, 31p NASA-TM-X-52098
Presented at the Propulsion Specialists Conf., Colorado Springs, Jun 14-18 1965.

Descriptors: *Buffer, *Coaxial flow, *Momentum transfer.

N66-18347 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
PROBLEMS ASSOCIATED WITH OBTAINING ACCURATE DYNAMIC STABILITY RESULTS FROM FREE-FLIGHT TESTS,
by G. T. Chapman and D. B. Kirk. 1965, 31p NASA-TM-X-56369
Presented at the Tech. Workshop on Dyn. Stability Testing, (2nd), Arnold Eng. Develop. Center, Tenn., Apr 20-23, 1965.

Descriptors: *Flight test, *Ballistic range, *Dynamic stability.

AD-458 348 **See Field 21H**

1B. AERONAUTICS

AD-632 929 **Field 1B, 20K, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Liege Univ. (Belgium). Laboratoire d'Aeronautique.
UPPER AND LOWER BOUNDS IN SPAR MATRIX ANALYSIS.
Research rept.,
by G. Sander. Aug 65, 47p SA-3
Contract AF 61 (052)-892

Descriptors: (*Matrix algebra, *Structures), Numerical analysis, Models (Simulations), Belgium.

AD-632 930 **Field 1B, 20K, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Liege Univ. (Belgium). Laboratoire d'Aeronautique.
BENDING AND STRETCHING OF PLATES. SPECIAL MODELS FOR UPPER AND LOWER BOUNDS.
Research rept.,
by B. Fraeijs de Veubeke. 1965, 33p SA-4
Contract AF 61 (052)-892
Presented at the Conference on Matrix Methods in Structural Mechanics, Dayton, Ohio, October 26-28 1965.

Descriptors: (*Structural parts, *Mechanical properties), Numerical analysis, Models (Simulations), Belgium.

AD-632 960 **Field 1B, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE ICE FOG PROBLEM AT EIELSON AFB, ALASKA.
Air Force surveys in geophysics,
by John H. Taylor, and James F. Church. Apr 66, 32p AFCRL-AFSG-176, AFCRL-66-230
Proj. AF-7605,
Task 760501

Descriptors: (*Ice fog, Alaska), (*All-weather aviation, Ice fog), (*Micrometeorology, Ice fog), Air Force, Landing fields, Fog, Air pollution, Countermeasures.

Identifiers: Eielson AFB.

This report summarizes the findings and conclusions drawn from a survey which was conducted at Alaskan bases. The purpose of the survey was to secure information necessary for making recommendations on the nature and level of effort of research programs which could be directed toward minimizing the disruptive effect of ice fog on air operations at Eielson Air Force Base. The ice fog phenomenon, its principal causes at Eielson, and the nature and extent of its effect on air operations are discussed. An examination is made of engineering approaches to the solution of ice fog problems and their influence on the apparent trend during the past ten years toward a decreasing frequency of occurrence. A recommendation is made for engineering designed to minimize pollutions from what is considered to be the primary source. Finally, there is a discussion of the feasibility of establishing an applied research program designed to provide operationally useful solutions to the ice fog problem. (Author)

AD-633 023 **Field 1B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
COMMENTS ON FUTURE AIR TRANSPORTATION SYSTEMS,
by T. F. Kirkwood. May 66, 9p P-3362

Descriptors: (*Air transportation, State-of-the-art reviews), Aeronautics, Civil aviation, Armed forces operations.

This paper discusses some possible military and civil applications for air transportation in the 1975-1985 time period.

AD-633 049 **Field 1B, 13L, 6E**
CFSTI Prices: HC$1.60 MF$0.50
Cornell-Guggenheim Aviation Safety Center, New York.
AVIATION CRASH INJURY SYMPOSIUM.
1961, 12p

Descriptors: (*Aviation injuries, *Crash injuries), (*Aviation safety, Symposia), Aeronautics, Civil aviation, Armed Forces (United States), Research program administration, Aviation accidents.

The Symposium was composed of high-level officials of the Department of Defense, Federal and

civil agencies that have an interest or responsibility in this field.

AD-632 920 See Field 20K

AD-632 922 See Field 20K

AD-632 923 See Field 20K

AD-633 249 See Field 15G

1C. AIRCRAFT

AD-632 715 Field 1C, 20K, 19E
CFSTI Prices: HC$1.00 MF$0.50
Frankford Arsenal, Philadelphia, Pa. Fire Control Engineering Directorate.
PRELIMINARY DETERMINATION OF FLEXURE BETWEEN THE COPILOT SIGHTING STATION AND WEAPON STATION ON THE UHIB HELICOPTER.
Test rept.,
by Donaldo, Furmanski. Jan 66, 21p
Proj. DA-1X120301D02301,
FA T65-7-1

Descriptors: (*Helicopters, *Fire control systems), (*Airframes, Deformation), (*Weapon systems, Helicopters), Firing tests (Ordnance), Aerodynamic characteristics, Flexural strength.

This report describes the first of a series of tests designed to provide data relative to the flexure between the gunner's sighting station and the weapons mounted on the UHIB Helicopter. This test, which was conducted principally for the purpose of checking out the procedures, was of a preliminary nature. Because of scheduling difficulties, the remaining tests have not been run and, as a result, the data collected in the preliminary runs is of particular interest. (Author)

N66-17428 Field 1C
CFSTI Prices: HC$4.00 MF$0.75
Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
A TWO-DIMENSIONAL STATIC STABILITY THEORY FOR AN AIR CUSHION VEHICLE WITH A CENTRAL STABILITY JET,
by A. J. Burgess. May 64, 116p AASU-256

Descriptors: *Aerodynamic stability, *Flow theory, *Two-dimensional flow, *Air cushion vehicle, *Jet stream.

N66-17648 Field 1C
CFSTI Prices: HC$2.00 MF$0.50
Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
AN INVESTIGATION OF THE INFLUENCE OF DUCT CONVERGENCE ON THE FLOW EXHAUSTING FROM THE EDGE JET OF AN AIR CUSHION VEHICLE,
by A. J. Burgess. Jun 64, 38p AASU-TN-258

Descriptors: *Jet exhaust, *Nozzle flow, *Air cushion vehicle, *Convergent nozzle.

N66-18076 Field 1C
CFSTI Prices: HC$1.00 MF$0.50
Flying Personnel Research Committee, London (England).
THE PERFORMANCE CHARACTERISTICS OF THE MK. 17 E OXYGEN REGULATOR UNDER INCREASED AMBIENT PRESSURES,
by A. S. Jarrett, and P. R. Wagner. Jun 64, 20p
FPRC-210

Descriptors: *Atmospheric pressure, *Oxygen regulator, *Performance characteristics, *Steady flow.

N66-18375 Field 1C
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
TRENDS IN REPEATED LOADS ON TRANSPORT AIRPLANES,
by T. L. Coleman. 1965. 61p NASA-TM-X-56283
Presented at the Symp. on Fatigue Design Procedures, Munich, Jun 16-18, 1965.

Descriptors: *Atmospheric turbulence, *Loading, *Oscillation, *Statistics, *Transport aircraft.

AD-632 679 See Field 17G

AD-632 838 See Field 19E

AD-632 862 See Field 21H

AD-632 921 See Field 20K

AD-633 139 See Field 20D

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

AD-633 106 Field 1D, 5E, 14B
CFSTI Prices: HC$3.00 MF$0.75
Bell Helicopter Co., Fort Worth, Tex.
EVALUATION OF THE RH-2 COCKPIT MOCK-UP.
Technical rept.,
by James G. Curtin, Dora J. Dougherty, and John H. Emery. Aug 65, 65p
Contract Nonr-4429 (00)
JANAIR D228-410-001

Descriptors: (*Cockpits, *Human engineering), (*Helicopters, *Flight simulators), Flight instruments, Instrument panels, Man-machine systems, Training devices, Pilots, Performance (Human).

Identifiers: JANAIR project, RH-2 aircraft.

This study represents one in a series of evaluations of the JANAIR concept of an IFR flight display system. The purpose of this experiment was to determine the feasibility of the cockpit layout and sub-panel design in terms of accessibility, operability in real time, the effect of training, and the performance of the required procedures. A concurrent objective was to examine means of improving the tested design. Testing was performed in a mock-up of the JANAIR Research Helicopter Number Two (RH-2) located at Bell Helicopter Company's Flight Simulation Laboratory. Five subject pilots learned and performed procedures for all flight test maneuvers. The procedures encompassed all manipulatory tasks to be performed throughout the simulated flight. Performance measures taken included: number of errors committed and time required to perform the procedures. Summary analyses of the findings indicate: (1) the time allowed to perform the required procedures is realistic and sufficient so as to preclude overburdening a single operator in flight, (2) some control knobs and selectors were inconveniently located on the right side of the panel, and (3) minor revisions were indicated to optimize procedures performance. The significance of the results is discussed and recommendations for optimum control design are noted. (Author)

AD-633 107 Field 1D, 14B
CFSTI Prices: HC$2.00 MF$0.50
Bell Helicopter Co., Fort Worth, Tex.
CONTACT ANALOG SIMULATOR EVALUATIONS: NUMERIC AUGMENTATION OF GRID PLANE ENCODEMENT.
Technical rept.,
by J. H. Emery, and C. A. Koch. Dec 65, 34p
Contract Nonr-4429 (00)
JANAIR TR-D228-420-007

Descriptors: (*Flight instruments, *Display systems), (*Helicopters, Flight simulators), (*Flight simulators, Display systems), Human engineering, Man-machine systems, Instrument panels, Cockpits, Mission profiles, Analog computers, Television display systems, Flight control systems.

Identifiers: JANAIR project, Contact Analog Simulator.

Measurement was made of the ability of a group of helicopter pilots to perform simulated rotary wing maneuvers under three instrument display conditions which augmented the JANAIR contact analog vertical display with numeric information. Moving tape scales, moving pointer scales and digital readouts, each presented with the basic grid plane were compared with each other and the basic grid plane alone. The numeric information displayed included indices of altitude, heading and airspeed. The display conditions were tested under: (1) a relatively stable cruise task and (2) a variable terrain following task. Measures of altitude control, airspeed control, heading control and appropriate collective control inputs were recorded. Results indicate that numeric information significantly enhanced performance when presented in conjunction with the contact analog and that the moving tapes and the moving pointers each produced significantly better performance scores than the digital readouts. These results were consistent in both helicopter tasks tested. (Author)

AD-633 269 Field 1D, 5H
CFSTI Prices: HC$5.00 MF$1.00
Bell Aerosystems Co., Buffalo, N. Y.
APPLICATION OF PILOT-CONTROLLER INTEGRATION TECHNIQUES TO A REPRESENTATIVE V/STOL AIRCRAFT.
Final rept.,
by John W. Gaul. Oct 65, 158p Rept. no. 2226-903001
Contract AF 33 (615)-1866
Proj. AF-8219
Task 821904
AFFDL TR-65-200

Descriptors: (*Vertical take-off planes, *Flight control systems), Design, Pilots, Man-machine systems, Costs.

Identifiers: X-22 aircraft.

The report presents final results of a study of the application of Pilot-Controller Integration (PCI) design techniques to the flight control system of a representative V/STOL aircraft. Under this program the validity of the concept was established in the application to the X-22A V/STOL. In this application the PCI technique indicated the areas of the X-22A flight control system where modifications would result in the greatest improvement to the probability of mission accomplishment. Design modifications were made and an iteration using the technique was accomplished and the payoff was evaluated. The digital program was developed and applied to the X-22A has general applicability to other aircraft. Several improvements to this program as well as to the details of technique application are suggested. (Author)

N66-15526 Field 1D
CFSTI Prices: HC$4.00 MF$1.00
Sperry Gyroscope Co., Ltd., Brentford (England).
AIRCRAFT GYROSCOPIC FLIGHT INSTRUMENTS.
Jan 65, 144p

Descriptors: *Autogyro, *Autopilot, *Gyroscope, *Magnetic compass, *Reference system, *Aircraft instrumentation, *Attitude gyro, *Compass, *Control system, *Flight instrument, *Gyrocompass.

1E. AIR FACILITIES

AD-632 958 Field 1E, 11I
CFSTI Prices: HC$2.00 MF$0.50

Marine Corps Landing Force Development Center, Quantico, Va.
HELICOPTER LANDING SITE MATERIALS.
18 May 66, 32p
Proj. 51-62-02

Descriptors: (*Landing mats, Helicopters), (*Laminated plastics, Landing mats), Vinyl plastics, Nylon, Reinforcing materials, Textiles, Weight, Effectiveness, Performance (Engineering), Trafficability.

Tests were conducted to determine the suitability of a flexible vinyl-nylon membrane as a helicopter landing site material. Two different weights of material and two different configurations were tested. One configuration was 150' square. The other consisted of four (4) 75' square sections joined in the field to provide a 150' square pad. The test results have shown that the single piece, 150' vinyl-nylon helipad provides a distinct advantage in minimizing dust and mud problems at advanced base helicopter landing sites where more permanent surfacing materials are unavailable or impractical for this purpose. The membrane serves only as an expedient measure over unprepared sand such as experienced in Vietnam. It is recommended that this item be approved for Marine Corps use as an interim measure until a more universal material is developed. (Author)

AD-633 191 **Field 1E**
CFSTI Prices: HC$3.00 MF$0.50
Arizona State Univ., Tempe.
AN ANALYSIS OF SEVERAL CHARACTERISTICS OF COMMERCIAL AIRLINE PASSENGERS AT PHOENIX, ARIZONA.
Master's thesis,
by John Robert Carstensen. May 66, 53p
Contract AF 33 (608)-1204

Descriptors: (*Airports,Public opinion), Arizona, Air traffic, Air transportation, Terminal flight facilities, Design, Optimization, Site selection.

Passengers are of prime importance in the design of an airport, since they are the reason for its existence. The objective of the study was to analyze five characteristics of commercial airline passengers at Phoenix Sky Harbor airport. Data from personal interviews conducted at Sky Harbor were analyzed. Results showed that commercially accommodated air travelers were attracted to three specific lodging areas, while locally originating passengers' homes formed no particular pattern, but were located in more affluent sections of the Phoenix area. No relationship could be established between distances from homes to the airport and residents' use of the airport, nor did suburban residents use the airport to a significantly greater degree than residents of Phoenix proper. Private autos were shown to be responsible for the majority of transportation to and from Sky Harbor, although rental cars were quite popular with nonresident travelers. (Author)

PB-170 096 See Field 5C

PB-170 155 See Field 5C

2A. AGRICULTURAL CHEMISTRY

PB-170 150 See Field 5C

2B. AGRICULTURAL ECONOMICS

PB-170 046 See Field 5C

PB-170 124 See Field 5C

PB-170 187 See Field 5C

PB-170 198 See Field 5C

2E. ANIMAL HUSBANDRY

PB-170 046 See Field 5C

2F. FORESTRY

PB-170 062 See Field 5C

PB-170 069 See Field 5C

PB-170 075 See Field 5C

PB-170 082 See Field 5C

PB-170 083 See Field 5C

PB-170 097 See Field 5C

PB-170 135 See Field 5C

PB-170 140 See Field 5C

PB-170 169 See Field 5C

PB-170 188 See Field 5C

PB-170 194 See Field 5C

PB-170 195 See Field 5C

PB-170 267 See Field 5C

3. ASTRONOMY AND ASTROPHYSICS

AD-633 244 **Field C**
CFSTI Prices: HC$2.00 MF$0.50
PACAF Epidemiological Lab., San Francisco, Calif. 96274. Epidemiological Flight (5th).
ADDITIONAL NOTES ON PHILIPPINE MOSQUITOES. PART I: ARMIGERES BAISASI, STONE AND THURMAN, 1958 AND ARMIGERES JOLOENSIS (LUDLOW), 1904.
Technical rept.,
by F. E. Baisas. 1965, 46p TR-17-65

Descriptors: (*Culicidae, Morphology (Biology)), Anopheles, Culex, Larvae, Adults, Epidemiology, Philippines, Japan.

Identifiers: Armigeres.

Seven species of Philippine Armigeres and Armigeres subalbatus from Japan are discussed. In the adult stage Amigeres joloensis of the Philippines and Armigeres subalbatus of Japan have in common certain markings on the mesonotum and abdominal sternites, and the mesonotal markings are variable or unstable, easily rubbed in caught wild adults and therefore of no great value in routine identification. However, the markings on the abdominal sternites remain fairly intact even in badly damaged specimens, for which reason they are very useful in rpractical diagnosis. In the pupal stage there is no character of generic or subgeneric value, and the specific differences, except in Armigeres magnus, are slight. The pupae of Armigeres joloensis and Armigeres baisasi cannot be differentiated and the pupa of Armigeres subalbatus resembels both very closely. In the larval stage A. joloensis, A. subalbatus and A. baisasi are alike. Two well marked characters may be of generic and subgeneric importance if these are found to be true for all other Armigeres of the Philippines and other countries. In all species examined including A. subalbatus, the tubercle or plate bearing mesothoracic hair 8 is fused with the plate from which the mesopleurals arise and the tubercle of metathoracic hair 7 is fused with the plate of the metapleurals. In those species belonging to the subgenus Armigeres (including A. subalbatus) mesothoracic hairs 5, 6 and 7 arise from a common elongated plate (true also in A. breinli as drawn by Belkin 1962), but in the species in the subgenus Leicesteria/Leicesterio-myia, these mesothoracic hairs arise separately from small plates. (Author)

3A. ASTRONOMY

AD-633 031 **Field 3A, 8B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
A CONTOUR MAP BASED ON THE SELENODETIC CONTROL SYSTEM OF THE AERONAUTICAL CHART AND INFORMATION CENTER OF THE U. S. AIR FORCE,
by T. A. Bray, and C. L. Goudas. Mar 66, 20p
D1-82-0518, Mathematical Note-457
Also available from the author.

Descriptors: (*Moon, *Mapping), Extraterrestrial topography, Maps, Astronomy, Photogrammetry.

Identifiers: Selenodetics.

The control system published in 1965 by the Aeronautical Chart and Information Center (ACIC) has recently been augmented by more than one hundred points, thus making it necessary to perform an analysis of the new enlarged system and construct the corresponding contour map which we present in this paper. This new map exhibits substantial consistence with the one constructed from only the 196 points of the original system, and appears to represent a stronger solution. (Author)

MIT-2098-99 See Field 3B

3B. ASTROPHYSICS

AD-632 705 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Dept. of Astronomy.
INVESTIGATIONS OF THEORETICAL PROBLEMS IN COSMICAL GAS DYNAMICS.
Final rept. 1 Jan-31 Dec 65,
by Peter O. Vandervoort. 18 Apr 66, 11p
Grant Nonr (G)-0009-65,
Proj. NR-046-794

Descriptors: (*Stars, Fluid mechanics), (*Nebulae, Fluid mechanics), Hydrogen, Temperature, Gas ionization, Mechanical waves, Sound, Shock waves, Stability.

Identifiers: Stellar evolution.

Various aspects of the evolution of H II regions (gaseous nebulae) surrounding newly formed stars of early spectral types were examined. The evolution of an H II region during the formation of the exciting star was considered, and it is shown that there are two modes of evolution. Physical processes governing the temperature structure and ionization structure of an H II region and an ionization front were investigated. Corrections to the growth rates for the instability of an ionization front were computed. There was an unsuccessful attempt to construct a statistical mechanics of sound waves in an isothermal gas. (Author)

AD-633 013 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
California Inst. of Tech., Pasadena.
ON SOME PREDICTED AND OBSERVED FEATURES OF QUASI-STELLAR SOURCES,
by John N. Bahcall. 1966, 28p
Contract Nonr-220 (47), Grant NSF-GP-5391

Descriptors: (*Nebulae, Line spectrum), Astrophysics, Galaxies, Interstellar matter, Hydrogen, Electron transistions, Spectroscopy, Nuclear physics.

Identifiers: Quasi-stellar.

The purpose of this paper is to correlate or explain some observed features of quasi-stellar sources

in a way that enables one to predict with simple models: (a) the relative strengths of the Lyman lines (np > ls transitions in hydrogen) that may be observed and (b) the optical depth of the nebulae beyond the Lyman continuum (hv > 13.6 eV).

AD-633 033 **Field 3B, 8B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Geo-Astro Physics Lab.
ISOTHERMS IN THE EQUATORIAL REGION OF THE TOTALLY ECLIPSED MOON,
by J. M. Saari, and R. W. Shorthill. Apr 66, 7p
D1-82-0530
Also available from the author.

Descriptors: (*Moon, Infrared scanning), (*Mapping, Moon), Extraterrestrial topography, Thermal properties, Maps, Astrophysics.

Identifiers: Selenodetics.

Isothermal contours of the totally eclipsed Moon are shown for the equatorial region. Location information is provided by a selenographic grid drawn to 1 degree increments of latitude and longitude. Fifty-five craters which are hot spots are identified by name. (Author)

AD-633 079 **Field 3B, 4A, 20H**
CFSTI Prices: HC$4.00 MF$0.75
Rochester Univ., N. Y. Dept. of Physics and Astronomy.
A MODEL FOR THE ORIGIN AND PROPERTIES OF THE COSMIC RAY RIGIDITY SPECTRUM,
by M. F. Kaplon, and G. Skadron. 15 Feb 66, 109p URPA-124

Descriptors: (*Cosmic rays, *Supernovae), Theory, Astrophysics, Nebulae, Particle spectra, Mathematical models, Nuclear physics.

Identifiers: Crab Nebula.

A model is proposed to explain a number of features of the differential rigidity spectra of the nuclear component of the primary cosmic radiation. A supernova explosion is assumed to result in the acceleration of nuclei to a pure power law rigidity spectrum and a composition relatively rich in heavy and medium weight nuclei. The supernova remnant into which these particles are injected is characterized as a large scale trapping region resulting from predominantly closed magnetic field lines which partially isolate the region from the surrounding galactic space. This feature of the supernova region is represented by a dipole-like field. Superimposed on this field we assume that magnetic irregularities produce a certain amount of distortion of the field lines in the interior of the source; and irregularities along the periphery of the source lead to local distortions of the field and hence, a mixing of galactic and source field lines in the neighborhood of these irregularities. (Author)

MIT-2098-99 **Field 3B, 3A, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
X-RAY AND GAMMA-RAY ASTRONOMY,
by Bruno Rossi. 24 Nov 64, 28p CONF-521-3
Contract AT (30-1)-2098
Prepared for presentation at Space Science Symposium (5th) Florence, May 1964.

Descriptors: (*X rays, Astronomy), (*Gamma rays, Astronomy).

N66-10048 **Field 3B**
CFSTI Prices: HC$5.00 MF$1.00
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE ULTRAVIOLET SPECTROSCOPY OF PLANETS,
by C. A. Barth. 1965, 261p
Contract NAS-7-100
NASA CR-67597

Descriptors: *Ultraviolet spectroscopy, *Planetary atmosphere.

N66-10609 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Radioscience Lab.
RESEARCH AT THE STANFORD CENTER FOR RADAR ASTRONOMY.
Semiannual rept. no. 5, 1 Jan - 30 Jun 65,
by V. R. Eshleman. Jul 65, 11p
Grant NSG-377
NASA CR-67794

Descriptors: *Lunar ionosphere, *Planetary atmosphere, *Lunar atmosphere, *Lunar surface, *Planetary surface, *Radar astronomy, *Radio astronomy.

N66-15357 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Huntsville, Ala.
STATISTICAL ANALYSIS OF PHOTOGRAPHIC METEOR DATA. PART II. VERNIANI'S LUMINOUS EFFICIENCY AND SUPPLEMENTED WHIPPLE WEIGHTING,
by C. C. Dalton. 18 Nov 65, 34p NASA-TM-X-53360

Descriptors: *Luminosity, *Meteor, *Statistical analysis, *Weighting (math).

N66-15425 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
LUNAR IMPACT CRATERS,
by P. D. Lowman, Jr. 1964, 12p
NASA TM-X-56115

Descriptors: *Evolution, *Selenography, *Topography, *Lunar crater, *Meteoritic crater.

N66-16180 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Coll. Observatory, Cambridge, Mass. Meteor Dept.
A THEORETICAL STUDY OF METEORIC TRAJECTORIES AND PROCESSES, INCLUDING EXAMINATION OF THE INCIDENCE AND CHARACTERISTICS OF PHOTOGRAPHIC METEORS BY REDUCTION OF ABOUT 600 DATA POINTS.
Final rept. 1 Jun 63-30 Oct 65,
by R. E. McCrosky, and F. L. Whipple. 1965, 20p
Grant NsG-460
NASA CR-69875

Descriptors: *Orbit, *Schmidt camera, *Meteor trail, *Photographic film.

N66-18361 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics andSpace Administration, New York. Goddard Inst. for Space Studies.
PRESUPERNOVA EVOLUTION (NEUTRINO STARS),
by H. Y. Chiu. 1965, 27p NASA-TM-X-56171

Descriptors: *Neutrino, *Stellar evolution, *Supernova, *Particle emission.

N66-18388 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
AN EXPLANATION OF TEKTITE CHEMISTRY IN TERMS OF LUNAR ASH FLOWS,
by E. W. Adams and J. A. Okeefe. 1964, 38p
NASA-TM-X-56128

Descriptors: *Geochemistry, *Lunar geology, *Tektite.

TID-21353 **Field 3B**
CFSTI Prices: HC$4.00 MF$1.25
Ohio Agricultural Experiment Station, Wooster.
REPORT OF PRELIMINARY ANALYSES CONCERNING NEOTOMA SOLAR RADIATION DATA SUPPLEMENT NO. 7,
by Jerry A. Koch, and Gareth E. Gilbert. Dec 62, 139p
Contract AT (11-1)-552

Descriptors: (*Solar radiation, Plants (Botany)), (*Forestry, Solar radiation).

Identifiers: Neotoma.

AD-632 703 **See Field 4A**

AD-632 761 **See Field 22B**

AD-632 843 **See Field 20J**

AD-633 105 **See Field 5A**

AD-633 237 **See Field 4A**

3C. CELESTIAL MECHANICS

AD-442 082 **Field 3C**
CFSTI Price: HC$1.60
Naval Air Engineering Center, Philadelphia, Pa.
EVALUATION OF ORGANIC COATINGS; INFORMATION ON ORGANIC COATING MATERIALS FOR SERVICE EVALUATION.
Final rept.
1964, 16p NAEC-AML-1965
N64 29230

Descriptors: (*Organic coatings, Tests), (*Aircraft finishes, Tests), Plastic coatings, Preparation, Per formance (Engineering), Instruction manuals, Packaging.

The purpose of the WEPTASK was to furnish Overhaul and Repair Departments and aircraft contractors coatings which showed promise in the laboratory. If these materials were considered satisfactory in field evaluation, then specifications for their procurement would be prepared. As a result, the use of newly developed coatings on aircraft would be facilitated, thereby reducing the use of proprietary coatings and upgrading the performance of finish systems on aircraft. The report furnishes information on general performance properties, suggested uses, quantities and their destination for shipment, formulation data and application instructions for coatings which are considered promising for field evaluation.

N66-17469 **Field 3C**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Experimental Astronomy Lab.
TWO-BODY LINEAR GUIDANCE MATRICES,
by L. P. Abrahamson and R. G. Stern. Jun 65, 66p RE-14
Grant NsG-254-62
NASA CR-70465
Presented at the Ion/AIAA Natl. Space Navigation and Commun. Meeting, Houston, Tex., Apr. 29, 1965.

Descriptors: *Matrix analysis, *Motion equation, *Coordinate system, *Two-body problem.

AD-633 239 **See Field 22C**

4A. ATMOSPHERIC PHYSICS

AD-632 665 **Field 4A, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.

THE MEASUREMENT OF PHASE AND AMPLITUDE RADIO WAVE INTERACTION AT UNIVERSITY PARK, PENNSYLVANIA, OCTOBER - NOVEMBER 1965.
Scientific rept.,
by Anthony J. Ferraro and Hai Sup Lee. 15 Mar 66, 36p Scientific-266
Contract AF 19 (628)-4014, Grant NSF-GP-846,
Proj. AF-8605,
Task 860502
AFCRL 66-263

Descriptors: (*Luxemberg effect, *Atmospheric sounding), (*Ionosphere, Luxemberg effect), Radio waves, Ionospheric propagation, Phase modulation, Amplitude modulation, Electrons, Temperature, Physics laboratories, Pennsylvania.

Identifiers: D-region, IQSY.

The objective of the present work is to study the properties of ionospheric D-region using radio wave interaction effect which is also commonly known as Luxembourg effect. The present technique closely follows that developed by Fejer (1955) for radio wave amplitude interaction experiment. However, the technique of measurement as well as the theory of radio wave interaction have been extended and generalized at the Ionosphere Research Laboratory by the introduction of complex coefficient of interaction T, to embody the effect of interaction on both the amplitude and the phase of radio waves. (Author)

AD-632 703 **Field 4A, 3B**
CFSTI Prices: HC$1.00 MF$0.50
Colorado Univ., Boulder.
SOLAR ULTRAVIOLET AND ATMOSPHERIC COMPOSITION RESEARCH.
Final rept. 1 Feb 62-31 Mar 65,
by William A. Rense and Fred C. Wilshusen. Mar 66, 26p
Contract AF 19 (628)-287,
Proj. AF-8627,
Task 862703
AFCRL 66-144

Descriptors: (*Solar radiation, *Ultraviolet spectroscopy), (*Atmospheric sounding, Ultraviolet spectroscopy), Sounding rockets, Ultraviolet equipment, Spectrum analyzers, Sun, Solar spectrum, Atmosphere, Physical properties, Metals, Optical properties.

Both solar radiation and atmospheric composition are most important physical aspects of the solar system which influence our environement. The theoretical concepts concerning the solar system must be adequately supported by experimental data. Three spectrographic instruments were designed, fabricated and flown on rockets in order to add to our knowledge concerning the ultraviolet radiation from the sun. An echelle spectrograph was specifically designed to obtain high resolution ultraviolet spectrum. Instrumentation was designed to determine the composition of the upper atmosphere by absorption methods. This instrumentation will also be flown on a rocket at a later date, after adequate laboratory testing has been accomplished. Considerable research concerning Phosphor Efficiencies and Optical Properties of Metals in the Far Ultraviolet has been accomplished to supplement the overall program of obtaining experimental data concerning solar radiation and atmospheric composition. (Author)

AD-632 827 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.75
Department of the Air Force, Washington, D. C.
CLEAR AIR TURBULENCE MEETING, 19, 20 AUGUST 1964.
1964, 81p

Descriptors: (*Clear air turbulence, Symposia), Meteorological parameters, Determination, Management planning, Weather forecasting, Wind, Aircraft, Hazards.

The purpose of meeting is (a) To have a free and complete exchange of information among all agencies involved in research and study in the forecasting and detection of Clear Air Turbulence. (b) To review current and planned programs to determine if there is sufficient effort in each area. (c) To determine areas where efforts should be better coordinated and/or consolidated. There is not at this time a fully proven 'indicator' of CAT. Most of the efforts described are directed at determining if a given parameter can provide such indication.

AD-632 918 **Field 4A, 20F**
CFSTI Prices: HC$5.00 MF$1.00
Institute for Defense Analyses, Arlington, Va. Research and Engineering Support Div.
LEVELS OF NOCTURNAL ILLUMINATION.
Research paper,
by Lucien M. Biberman, Lawrence Dunkelman, Marion L. Fickett, and Reinald G. Finke. Jan 66, 195p Rept. nos. RP-P-232, IDA/HQ-66-4569
Contract SD-50,
Task T-36

Descriptors: (*Night sky, *Sky brightness), (*Optics, Atmosphere), (*Illumination, Night sky), Sun, Moon, Light, Intensity, Distribution, Tables.

Summary tables show, for four lunar months (midsummer, mid-fall, mid-winter, and mid-spring), the number of hours in which the illumination exceeds levels in 8 decades from 1.5 x 0.000001 lumens per square foot to 1.5 x 10 (+1) lumens per square foot; the full tables list the hours, day by day, in which the illumination exceeds the same 8 levels. Note that the sum of the hours not exceeding and the hours exceeding a given level equals a constant which is the total number of hours in a lunar month. So that these tables may be more easily understood, they also have been plotted at levels of 1.5 x 0.00001, 1.5 x 0.001, 1.5 x 0.1, and 1.5 x 10 (+1). These curves show the number of hours per day as a function of date, the time that terrestrial illumination equals or exceeds these values. There are separate sets of tables for latitudes of 0 degree, 30 degrees, and 60 degrees latitude. (Author)

AD-633 116 **Field 4A, 18H**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THE EXTENT OF RADIOACTIVE EQUILIBRIUM BETWEEN RADON AND ITS SHORT-LIVED DAUGHTER PRODUCTS IN THE ATMOSPHERE.
Interim rept.,
by L. B. Lockhart Jr., and R. L. Patterson Jr. 5 Apr 66, 20p NRL-6374
Contract AT- (49-7)-2435,
Proj. RR-004-02-42-5151

Descriptors: (*Radon, *Atmosphere), Radioactivity, Radioactive decay, Radiation measurement systems.

A set of experimental conditions has been derived which optimizes the accuracy with which the radon content of the atmosphere and its apparent residence time there can be determined from measurement of the filterable gross Beta activity during two separate 10-minute periods following the end of a 20-minute collection period. The 20-minute collection is made on a filter of essentially 100% retentivity (glass fiber filter) and counted for beta activity through a 10-mil (70.mg/sq cm) aluminum absorber on equipment of known efficiency for the beta particles emitted by RaB and RaC. The ratio of measured counts during the 61-through-71-minute decay period to that during the 1-through-11-minute period is employed to obtain the atom ratio of RaC to RaB (rho) in the air sampled, the apparent age (tau) of the conglomerate of radon and its daughters, and the total counts to be expected from any given radon concentration in the air. Extensive examples of atmospheric measurements are given which suggest that under most conditions in the free atmosphere radon is essentially at secular equilibrium with its daughter products. Other collections made following addition of radon to a restricted volume show the expected increase in rho with time, which confirms the basic validity of the procedure. (Author)

AD-633 237 **Field 4A, 20N, 3B**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
ELECTROMAGNETIC WAVE PROPAGATION AND THE UPPER ATMOSPHERE: COMPILATION OF ABSTRACTS.
Rept. no. 1 on ATD work assignment no. 3.
11 Feb 66, 84p ATD-66-15
TT 66-61280
Based on Soviet-Satellite open sources pub. 1964-65. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Electromagnetic waves, *Ionospheric propagation), (*Upper atmosphere, Wave transmission), Cosmic rays, Solar radiation, Nuclear explosions, Ionospheric disturbances, Magnetic storms, Terrestrial magnetism, Whistlers, Aurorae, Astrophysics, Geophysics, Abstracts, USSR.

This compilation of abstracts is based on Soviet-Satellite open sources published 1964-1965. It is the first in a series of reports reviewing Soviet research on electromagnetic wave propagation and the upper atmosphere. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 85 entries are arranged alphabetically by author within each of the following categories: ionosphere and EM wave propagation (27 entries), solar and cosmic radiation effects on the ionosphere and the geomagnetic field (34 entries), geomagnetism and whistlers (13 entries), effect of nuclear bursts on EM wave propagation (1 entry), aurora and EM wave propagation (7 entries), and over-the-horizon propagation studies (3 entries). The bibliography contains 85 entries. Other pertinent information included: experiments and measurements conducted by means of the Electron satellites, radio astronomy, ionospheric inhomogeneities, ionospheric currents and winds, solar radio emission, solar flares, atmospherics, magnetic storms, ionospheric backscatter. (Author)

AD-633 251 **Field 4A, 20C, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
ELECTRIC FIELDS IN THE MAGNETOSPHERE,
by James W. Dungey. 10 Apr 66, 15p Scientific-269
Contract AF 19 (628)-4014, Grant NSF-GP-5611
Proj. AF-8605,
Task 860502
AFCRL 66-300

Descriptors: (*Electric fields, *Upper atmosphere), (*Magnetohydrodynamics, Upper atmosphere), Atmospheric electricity, Ionosphere, Electron density, Solar wind, Plasma physics.

The first approximation corresponds to perfect conductivity and relates to the DS circulation. The component E11 parallel to B must be controlled by charge neutrality and the interaction with low energy particles is most important. Electrons move fast compared to the characteristic time of the field and approximations can be used, but not for protons. Sudden changes in the situation occur at reconnection. In the tail the discussion concerns interdiffusion of plasma between the magnetosphere and the solar wind. The possibility of a large E11 being set up occurs only at the tail reconnection. The low electron density in the magnetosphere is still puzzling. (Author)

AD-633 272 **Field 4A, 20N, 20F, 9E**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
ENERGY LOSSES IN A FLATWISE BEND OF AN OPTICAL WAVE GUIDE. MEASUREMENT OF THE TRANSMISSIVITY OF THE ATMOSPHERE AT A WAVE LENGTH OF 0.87mm,
by Yu. I. Kaznacheev, and N. K. Gorshkova. 1966, 12p Translation-1060
TT 66-61284
Trans. of Radiotekhnika i Elektronika (USSR) v9 n6 p1076-9; 943-8 1964.

Descriptors: (*Optics, *Waveguides), (*Atmosphere, Wave transmission), (*Light transmission, Atmosphere), Electromagnetic waves, Propagation, Solar radiation, Absorption, Water vapor, USSR.

AD-633 302 **Field 4A, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
EFFECT OF TEMPERATURE CHANGES ON THE ELECTRON DENSITY DISTRIBUTION IN THE F2-REGION OF THE IONOSPHERE II.
Interim rept.,
by Y. V. Somayajulu. 20 Apr 66, 24p Scientific-270
Contract AF 19 (628)-4014, Grant NSF-GP-5611,
Proj. AF-8605,
Task 860502
AFCRL 66-313

Descriptors: (*Ionosphere, Electron density), (*Atmospheric temperature, Electron density), Atmosphere models, Mathematical models, Meteorology.

Identifiers: F2-region.

In this report the problem of changes in the F2 - region electron density distribution caused by changes in the neutral gas temperature is investigated using an analytical representation of the equilibrium quiet-day electron density distribution under the influence of production, loss and diffusion. Using the currently accepted temperature dependences of these quantities it is concluded that the change caused in N sub m F2 is small and that under certain conditions N sub m F2 may increase or decrease. The main effect of temperature, under these conditions, is to increase the thickness of the F2 -region; in agreement with observation. It is also shown that to explain the large reduction in N sub m F2 in midlatitudes during storms, the loss rate has to be quite sensitive to temperature. (Author)

AD-633 417 **Field 4A, 20N**
CFSTI Prices: HC$6.00 MF$1.25
Navy Electronics Lab., Dan Diego, Calif.
REFRACTION OF REAL TROPOSPHERE AND OF CRPL REFERENCE ATMOSPHERE COMPARED.
Research rept.,
by C. H. Sheddy. 2 Feb 66, 212p NEL-1352
Proj. SR-008-01-01,
Tasks 7031, MEL-M10361

Descriptors: (*Atmospheric refraction, Refractive index), (*Troposphere, Radio transmission), (*Radio waves, Propagation), Marine meteorology, Atmospheric sounding, Radiosondes, Telemetering data, Graphics, Atmosphere models, Mathematical prediction.

The CRPL reference atmosphere was evaluated on the basis of comparison with radiosonde data taken at both coastal and ocean weather stations in the southeastern North Pacific. Results indicate that corrections for angular aiming errors due to refraction can be made rather accurately at the ocean weather stations by use of the CRPL reference atmosphere. Selected calculations, in the form of a set of 202 figures, include seasonal trends, variation of refraction with elevation angle and height of satellite, and incidence of ducting.

N66-15359 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.
N2 TEMPERATURE AND DENSITY DATA FOR THE 150 TO 300 KM REGION AND THEIR IMPLICATIONS,
by G. R. Carignan, N. W. Spencer, andD. R. Taeusch. Dec 65, 33p NASA-TM-X-55362, X-620-66-5

Descriptors: *Nitrogen, *Temperature measurement, *Density measurement, *Molecular gas, *Thermosphere.

N66-15501 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
ATMOSPHERIC STRUCTURE AT 130-200 KM ALTI- TUDE FROM OBSERVATIONS ON GRENADE GLOW CLOUDS DURING 1962-63,
by K. H. Lloyd and L. M. Sheppard. Sep 65, 34p WRE-HSA-19

Descriptors: *Atmospheric composition, *Ground station.

N66-16051 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
MEASUREMENTS OF THE MAGNETIC FIELDS IN INTERPLANETARY SPACE AND THE MAGNETOSPHERE,
by N. F. Ness. Aug 65, 58p NASA-TM-X-55352, X-615-65-352
Presented at the Intern. Conf. on Cosmic Rays, (9th) London, Sep 6-17 1965.

Descriptors: *Interplanetary magnetic field, *Magnetosphere, *Satellite measurement, *Space probe.

N66-16697 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
FURTHER REMARKS ON THE ABSENCE OF A VERY EXTENDED MAGNETOSPHERIC TAIL,
by J. A. Van Allen. 1965, 24p Rept. no. 65-40
Contract NAS7-100
NASA CR-70047

Descriptors: *Mariner IV space probe, *Electron intensity, *Magnetosphere.

N66-16720 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Space Physics Research Lab.
MEASUREMENT OF THE EARTH'S ATMOSPHERE.
Final rept.,
by A. F. Nagy, and D. R. Taeusch. Nov 65, 23p
Contract NASr-54 (01)
NASA CR-70019

Descriptors: *Earth atmosphere, *Meteorological probe, *Pressure measurement, *Atmospheric temperature, *Density measurement.

N66-17319 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
ON THE ACCURACY OF THE GRAVITATIONAL POTENTIAL AS DERIVED FROM CAMERA OBSERVATIONS OF ARTIFICIAL SATELLITES RESEARCH IN SPACE SCIENCE,
by W. J. Kohnlein. 15 Nov 65, 23p SAO-SR-194
Grant NsG-87-60
NASA CR-70389

Descriptors: *Gravitational potential, *Satellite photography, *Tesseral harmonics, *Zonal harmonics.

N66-18164 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. High Altitude Engineering Lab.
NEUTRAL COMPOSITION,
by E. J. Schaefer. Feb 66, 41p Rept. no. 05627-3-S
Contract NASr-54 (05)
NASA CR-70523

Descriptors: *Atmospheric composition, *Ion source, *Recombination.

N66-18327 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
INVESTIGATION OF THE MAJOR CONSTITUENTS OF THE APRIL-MAY 1963 HETEROSPHERE BY THE EXPLORER XVII SATELLITE,
by M. Nicolet and C. A. Reber. Feb 65, 60p
NASA-TM-X-56188, X-650-65-64

Descriptors: *Helium, *Oxygen, *Explorer XVII satellite, *Nitrogen, *Upper atmosphere.

N66-18343 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
SHOCK WAVES IN THE SOLAR WIND AND GEOMAGNETIC STORMS,
by J. R. Spreiter and P. A. Sturrock. 1965, 27p
NASA-TM-X-56534

Descriptors: *Shock wave, *Solar wind, *Geomagnetic storm.

N66-18351 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
HYDROMAGNETIC FLOW AROUND THE MAGNETOSPHERE,
by A. Y. Alksne, J. R. Spreiter, and A. L. Summers.1965, 74p NASA-TM-X-56548

Descriptors: *Magnetohydrodynamic flow, *Solar wind, *Geomagnetic field, *Magnetohydrodynamics.

N66-18353 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ROCKET MEASUREMENTS OF SQ CURRENTS AT MID-LATITUDE,
by T. N. Davis, J. P. Heppner, and J. D. Stolarik.Jun 65, 47p NASA-TM-X-56564, X-612-65-226

Descriptors: *Gas cell, *Ionospheric current, *Magnetometer, *Rubidium, *Nike-Apache rocket.

N66-18358 **Field 4A**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RADIATIVE CHARACTERISTICS OF CLOUDS IN THE INFRARED,
by R. E. Samuelson. 1965, 108p NASA-TM-X-56169

Descriptors: *Cloud, *Infrared radiation, *Thermal emission, *Atmospheric scattering, *Radiative heat transfer.

N66-18363 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
PARTICLE TRAJECTORIES IN MODEL CURRENT SHEETS. PART I-ANALYTICAL SOLUTIONS,
by T. W. Speiser. 1965, 25p NASA-TM-X-56544

Descriptors: *Particle trajectory, *Current sheet, *Magnetic field.

N66-18365 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, New York. Goddard Inst. for Space Studies.
ON THE VARIATIONS OF THE THERMOSPHERIC STRUCTURE,
by W. Priester. 1965, 48p NASA-TM-X-56542

Descriptors: *Satellite drag, *Solar flux, *Atmospheric density, *Diurnal variation, *Thermosphere, *Time dependency.

N66-18404 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
LOSS PROCESS FOR HELIUM IONS IN THE UPPER ATMOSPHERE,
by S. J. Bauer. Dec 64, 12p NASA-TM-X-54955, X-615-64-374

Descriptors: *Helium, *Ion, *Upper atmosphere.

AD-455 554 **See Field 20A**

AD-455 968 **See Field 20A**

AD-632 875 **See Field 8N**

AD-633 079 **See Field 3B**

AD-633 104 **See Field 14B**

AD-633 105 **See Field 5A**

4B. METEOROLOGY

AD-632 668 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania State Univ., University Park.
RESEARCH IN FOUR-DIMENSIONAL DIAGNOSIS OF CYCLONIC STORM CLOUD SYSTEMS.
Scientific rept.,
by Edwin F. Danielsen. Jan 66, 62p Scientific-1
Contract AF 19 (628)-4762,
Task 669802
AFCRL 66-30

Descriptors: (*Air mass analysis, *Storms), (*Weather forecasting, Numerical methods + procedures), Cyclones, Clouds, Atmospheric precipitation, Atmospheric motion, Mathematical prediction.

The rapidly developing storm of 28-30 November 1963 is selected to establish techniques for testing the reliability of various diagnostic procedures. The method of constructing isentropic trajectories is discussed and the results of applying these trajectories to determine average vertical motions and relative humidities are presented. These results which apply at the mid-time between the standard radiosonde releases permit comparisons to both the observed clouds and precipitation. Special intermediate soundings are available which provide a direct check on the advected moisture and an indirect check on the trajectories. Comparisons are also made with machine calculated instantaneous vertical motions. In general, it is found that the vertical motions derived from the isentropic trajectory method provide the greatest resolution and closest agreement with the reported clouds and precipitation. (Author)

AD-632 721 **Field 4B, 8J**
CFSTI Prices: HC$2.00 MF$0.50
Arctic Meteorology Research Group, McGill Univ., Montreal (Quebec).
CLIMATE CHANGE OVER THE POLAR OCEAN. I: THE RADIATION BUDGET,
by E. Vowinckel and Svenn Orvig. Jan 66, 40p
Meteorology-79
Contract DA-19-129-AMC-490 (N)
USA NLABS TR-66-8-ES

Descriptors: (*Climatology, *Arctic Ocean), (*Solar radiation, Marine meteorology), (*Marine meteorology, Arctic Ocean), Heat flux, Meteorological parameters, Polar regions.

Identifiers: Polar Ocean.

An analysis is presented of possible changes in the radiative terms of the Polar Ocean energy budget. Theoretical polar atmospheres are discussed with various changes in the radiation balance. It is concluded that the atmosphere is, at present, adjusted in the best possible way for the conservation of energy. Radiation budgets are presented, for various assumed conditions. The optimum surface conditions would occur with winter overcast and summer clear sky. The earth-atmosphere radiation budget is presented for an open Polar Ocean. Relatively minor variations in any term can result in a complete freeze-over or complete melting. The atmospheric advection required with an open Polar Ocean would decrease significantly from the present. It might even become, in winter, a heat export from the Polar Ocean. (Author)

AD-632 781 **Field 4B**
CFSTI Price: MF$0.75
Weather Bureau, Washington, D. C.
RADIOSONDE OBSERVATION COMPUTATION TABLES (WBAN).
Jan 66, 70p
NAVWEPS 50-1D-13
Prepared in cooperation with Dept. of Commerce, Dept. of the Air Force and Dept. of the Navy.

Descriptors: (*Radiosondes, Telemetering data), (*Atmospheric sounding, *Telemetering data), (*Meteorology, Telemetering data), Meteorological parameters, Coding.

Identifiers: WBAN.

The tables and diagrams are used in the evaluation of radiosonde observations. For further details concerning their use, refer to (AD-627 868) Manual of Radiosonde Observations (WBAN). (Author)

AD-632 790 **Field 4B, 14B**
CFSTI Prices: HC$17.10 MF$1.00
Bendix Corp., Southfield, Mich. Research Labs. Div.
DEVELOPMENT OF AM OZONE SENSOR FOR ATMOSPHERIC SOUNDING.
Technical note,
by C. C. Matle, C. D. Stout, and R. Zielonka. 15 Dec 61, 175p Rept. no. 1998
Contract AF 33 (600)-41821

Descriptors: (*Atmospheric sounding, *Ozone), (*Meteorological instruments, Ozone), (*Telemeter systems, Atmospheric sounding), Probes, Silver, Films, Chemical reactions, Surface area, Electrical conductance, Sounding rockets, Meteorological balloons.

This report describes the development of a new type of ozone sensor for use at high altitudes of the atmosphere. The basic concept employed was the detection of the surface reaction of ozone with a thin, solid film of silver by the measurement of changes in film electrical conductivity. This sensor is useful for the detection of ozone at high altitudes and in the dark and can be used in rocketsondes and balloonsondes. It is simple, reliable, and can be produced economically even in small quantities. When prepared for production in moderate quantities, this sensor will have a very attractive unit cost. It is small, light, and has simple sampling requirements. The report describes all the aspects of development, design, and laboratory and environmental tests. Sonde field tests, not completed at the time of writing, will be described in a subsequent report. (Author)

AD-632 791 **Field 4B**
CFSTI Prices: HC$5.60 MF$0.50
Bendix Corp., Southfield, Mich. Research Labs. Div.
DEVELOPMENT OF A HYPSOMETER FOR ATMOSPHERIC SOUNDING.
by F. L. Adams and L. W. Walker. Apr 62, 53p RLD-2056
Contract AF 33 (600)-41821

Descriptors: (*Hypsometers, *Atmospheric sounding), Design, Construction, Environmental tests, Performance (Engineering), High altitude, Meteorological instruments.

This report describes the development of a descent hypsometer for use at high altitudes in the atmosphere. The basic concept employed is to measure the equilibrium temperature of a boiling liquid and its pure vapor while the latter is in equilibrium with the ambient pressure. The ambient pressure is then determined from the known vapor-pressure temperature characteristics of the liquid, or by direct calibration. This sensor can be used in rocketsondes and dropsondes. It is simple, reliable, and can be produced economically even in small quantities. When prepared for production in moderate quantities, the sensor will have a very attractive cost. It is small, light, and has simple sampling requirements. This report describes all the aspects of development, design, and laboratory and environmental tests. Sonde field tests, which were successfully completed, are described in another report. (Author)

AD-632 792 **Field 4B**
CFSTI Prices: HC$8.60 MF$0.75
Bendix Corp., Southfield, Mich. Research Labs. Div.
DEVELOPMENT OF AN INDEX OF REFRACTION SENSOR FOR ATMOSPHERIC SOUNDING.
by R. L. Berry, T. J. Mohan, and C. D. Stout. 25 Jun 62, 82p RLD-2057
Contract AF 33 (600)-41821

Descriptors: (*Refractometers, *Atmospheric sounding), Refractive index, Atmospheric refraction, Meteorological instruments, Oscillators, Capacitors, elemeter systems, Environmental tests, Performance (Engineering).

This report describes the development of a capacitor-type of index of refraction sensor for atmospheric sounding. The basic concept employed was that the variations of permittivity of the sample air flowing through a sensing capacitor produce changes in a stable oscillator's operating frequency. Since the change in permittivity is related by a simple square root function to the index of refraction, the percent change in oscillator frequency is directly proportional to the percent change in the index of refraction. A stable, crystal-controlled reference oscillator is included in the sensor to provide a difference frequency suitable for modulating a telemetry transmitter. The entire sensor was packaged for dropsonde applications. The report describes all the aspects of development, design, and laboratory and environmental tests. Sonde field test data, not reduced and analyzed at the time of writing, will be presented in a subsequent report. (Author)

AD-632 844 **Field 4B, 16B, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT, AEROBEE NASA 4.189 DS (28 APRIL 1966),
by Marjorie McLardie Hoidale. May 66, 25p DR-15
Task DA-1V650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Test facilities, New Mexico.

Identifiers: Ballistic meteorology, Aerobee.

Meteorological data gathered for the launching of Aerobee NASA 4.189 DS are presented for the National Aeronautics and Space Administration, the U. S. Naval Research Laboratory and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form. (Author)

AD-632 845 **Field 4B, 16B, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT, AEROBEE AD 3.723 (28 APRIL 1966),
by Marjorie McLardie Hoidale. May 66, 24p DR-17
Task DA-1V650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Test facilities, New Mexico.

Identifiers: Ballistic meteorology, Aerobee.

Meteorological data gathered for the launching of Aerobee AD 3.723 are presented for the Air Force Cambridge Research Center, the Colorado University, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form. (Author)

AD-632 878 **Field 4B, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Earth Sciences Div. Army Natick Labs., Mass.
CLIMATIC ATLAS OF SOUTHEAST ASIA (TEMPERATURE, RAINFALL, TEMPERATURE-HUMIDITY INDEX).
Technical rept.,
by Howard L. Ohman. Dec 65, 103p ES-19
Proj. 1VO-25001-A129

Descriptors: (*Climatology, *Southeast Asia), Thailand, Vietnam, Laos, Cambodia, Burma, Malaya, Singapore, Meteorological parameters, Geography, Maps.

Eighty-seven maps present the distribution in Southeast Asia (Thailand, Vietnam, Laos, Cambodia, Burma south of 25 degrees N. Latitude, and the peninsular portion of Malaysia) of various climatic statistics of temperature, rainfall, and the temperature-humidity index. Maps for each month of the year have been prepared for: mean monthly temperature, mean daily maximum temperature, mean daily minimum temperature, absolute maximum temperature, mean monthly rainfall, mean number of rainy days per month, and mean daily temperature-humidity index for the warmest hour of the day. Single maps of mean annual rainfall, the physiography of the region, and of the names and location of climatic stations are also included. The maps are drawn in considerable detail having been based not only on the available climatic data but also on the distribution of mountain ranges, major water bodies, and other geographic features. A brief text discusses the preparation of the maps and describes a few of the important distributional aspects of climate shown by the maps. (Author)

AD-632 919 **Field 4B, 16B, 19D**
CFSTI Prices: HC$2.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT 396 LANCE (MISSILE NO. 035, ROUND NO. 17 RBL) (8 APRIL 1966),
May 66, 35p DR-14
Task IV650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectioies, Impact prediction, Rocket research, Test facilities, Launching sites, New Mexico.

Identifiers: Ballistic meteorology, Lance (Missile).

Meteorological data gathered for the launching of 396 Lance, Missile Number 035, Round Number 17 RBL, are presented in tabular form. (Author)

AD-632 995 **Field 4B**
CFSTI Prices: HC$6.00 MF$1.25
RAND Corp., Santa Monica, Calif.
SOVIET DATA ON THE ARCTIC HEAT BUDGET AND ITS CLIMATIC INFLUENCE,
by J. O. Fletcher, B. Keller, and S. M. Olenicoff.
May 66, 204p RM-5003-PR
Contract AF 49 (638)-1700

Descriptors: (*Arctic regions, *Climatology), (*Meteorology, Arctic regions), Clouds, Absorption, Scattering, Solar radiation, Ice, Oceanology, Atmospheric motion, Heat transfer, Heat flux, USSR.

Identifiers: Heat budget.

A collection of papers bearing on the heat budget of the Arctic and its interrelationship with world climate. Most are heretofore unavailable translations from the Russian. Also included are an introduction to the collection as a whole by the senior editor, and a summary of what is known and what may be suspected of the relationship between the Arctic heat budget and atmospheric circulation at lower latitudes. (Author)

AD-633 075 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
DIURNAL VARIATIONS OF DENSITY, PRESSURE, AND TEMPERATURE IN THE ATMOSPHERE,
by R. S. Zhantuarov. 1 Apr 66, 7p ATD-66-36
TT 66-61266
Trans. of mono. Akademiya Nauk SSSR. Komissiya po Issledovaniyu i Ispolzovaniyu Kosmicheskogo Prostranstva, Moscow, 1965 p39-41.

Descriptors: (*Atmosphere, Diurnal variations), (*Meteorology, Diurnal variations), Density, Barometric pressure, Atmospheric temperature, Heat transfer, Solar radiation, USSR.

According to the author the theory of diurnal fluctuations in the atmosphere is unsatisfactory at present. A short description of interpretations by Harris and Priester on this theme (diurnal fluctuations) is given. The author proposes another way to solve the problem which is based on the theory of tides in the atmosphere. The proposition is discussed at some length and is analyzed mathematically. In conclusion, the author admits that the theory requires further refinements, but preliminary results already indicate a complicated dependence of the amplitude and phase on the height in the interval from 100 to 200 km; this indicates that the dynamic characteristics of this region of the atmosphere have an important influence on the processes taking place in these layers, thus creating, so to speak, 'boundary conditions' for them, i.e., the energy balance of the upper atmosphere is determined not only by absorption of solar radiation and by heat conductivity, but also by the fluctuating properties of the atmosphere.

AD-633 088 **Field 4B, 20D, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Huachuca, Ariz. Research Div.
WIND TUNNEL MODELING OF VELOCITY PROFILES OF THE ATMOSPHERIC SURFACE LAYER.
Technical rept.,
by Harry W. Maynard. Apr 66, 23p
Proj. DA-1V0-14501-B53A-08
ECOM 6019

Descriptors: (*Micrometeorology, Wind tunnel models), (*Atmosphere models, *Wind tunnel models), Atmosphere, Boundary layer, Fluid flow, Atmospheric motion, Simulation, Wind tunnels.

Many of the conditions commonly assumed for studies of the atmospheric boundary layer can be reproduced in a low-speed wind tunnel. Valid criteria are needed to determine similarity of flows obtained in wind tunnel experiments and natural flows. Reasonably good general indications are available from comparison of normalized velocity profiles from wind tunnel and field observations. In this paper, a dimensionless modeling parameter, K, is examined. This is a point parameter which is a function of both the local mean velocity and local turbulent shear stress. Preliminary results indicate that K has merit as a modeling parameter for the limited class of flows discussed. (Author)

AD-633 166 **Field 4B, 16B, 19D**
CFSTI Prices: HC$2.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT, 396 LANCE (MISSILE NO. 031, ROUND NO. 18 RPL (15 APRIL 1966).
May 66, 46p DR-20
Task DA-1V650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Launching, Test facilities, New Mexico.

Identifiers: Lance (Missile), Ballistic meteorology.

Meteorological data gathered for the launching of 396 Lance, Missile Number 031, Round Number 18 RPL, are presented in tabular form. (Author)

AD-633 196 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
New York Univ., N. Y.
A MARKOV CHAIN MODEL FOR MEAN TEMPERATURE OCCURRENCES AT NEW YORK CITY, NEW YORK.
Master's thesis,
by Joseph C. Lach Jr. Jun 66, 93p
Contract AF 33 (608)-1258

Descriptors: (*Climatology, New York), (*Atmospheric temperature, New York), Urban areas, Meteorological parameters, Probability, Mathematical models, Statistical analysis, Statistical data.

Identifiers: New York (City).

A simple Markov chain probability model is found to fit most of the mean daily temperature data for New York City. Daily mean temperature data are tested for a twenty-four year period (1936-1959), and monthly mean temperature data are tested for a ninety year period (1871-1960). Both sets of data are tested for each month of the year and for the following periods: January and February, April

and May, July and August, October and November, and January through December. Chi-square tests show that the ninety year monthly data are not Markovian except for the month of July. During the periods that the model fits the mean daily temperature data, the probability that the mean temperature for any day will be above or below the long term mean (twenty-four years) for the respective month depends only on whether the mean of the preceeding day is above or below the monthly mean. This probability is independent of the events of earlier days. The probabilities of several temperature occurrence patterns can be determined by using the mathematically derived properties of the Markov chain model. (Author)

AD-633 217 **Field 4B, 16B, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT, HONEST JOHN MISSILE 714, ROUND NO. 520 RML (27 APRIL 1966).
May 66, 24p DR-21
Task DA-1V650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Launching, Test facilities, New Mexico.

Identifiers: Honest John, Ballistic meteorology.

Meteorological data gathered for the launching of Honest John, Missile Number 714, Round Number 520 RML, are presented in tabular form. (Author)

AD-633 219 **Field 4B, 16B, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT, HONEST JOHN MISSILE NO. 713, ROUND NO. 519 RML (12 APRIL 1966).
May 66, 16p DR-23
Task DA-1V650212A127-02

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Launching, Test facilities, New Mexico.

Identifiers: Honest John, Ballistic meteorology.

Meteorological data gathered for the launching of Honest John, Missile Number 713, Round Number 519 RML, are presented in tabular form. (Author)

AD-633 275 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
ELEMENTS OF WEATHER AND CLIMATE KAZAKH SSR (USSR): SUMMARY OF DATA.
Supplemental rept. no. 2,
by Joseph A. Gwyer. 18 Apr 66, 18p ATD-66-40
TT 66-61285
Based on Soviet open sources pub. 1965. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Climatology, USSR), Meteorological parameters, Data, Maps.

Identifiers: Kazakh SSR.

This summary of data is based on Soviet open sources published in 1965. It is a supplemental report to be used with ATD Report 65-105, 19 November 1965, GAZETTEER OF PLACES AND FEATURES IN THE KAZAKH SSR (USSR). The Introduction lists abbreviations used in the report. In a short paragraph (Climate-General) the author briefly describes the general climate of the Kazakh SSR. In the next section (Climate-Specific Areas) the author divides Kazakh SSR into eighteen distinct areas and features the following specific climatic conditions: general climate; average temperature (Jan., July, daily); annual precipitation (total run-off); winter precipitation; months of maximum precipitation; showers (total precipitation, average maximum intensity, precipitation/shower); wind. The report includes a large map of the Kazakh SSR. The sources used (three) are listed at the end of the report. (Author)

N66-16970 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
PROJECT FOG DROPS. INVESTIGATION OF WARM FOG PROPERTIES AND FOG MODIFICATION CONCEPTS.
Quarterly progress rept. 15 Feb 66,
by W. C. Kocmond. 1966, 26p CAL-RM-1788-P-11
Contract NASr-156
NASA CR-70202

Descriptors: *Dispersion, *Electric discharge, *Seeding, *Weather control, *Fog.

AD-632 960 **See Field 1B**

AD-633 032 **See Field 8L**

AD-633 105 **See Field 5A**

AD-633 302 **See Field 4A**

AD-633 353 **See Field 20D**

N66-15514 **See Field 22B**

5A. ADMINISTRATION AND MANAGEMENT

AD-632 762 **Field 5A, 20L, 7D, 11F, 11I, 11B, 18H**
CFSTI Prices: HC$7.40 MF$2.00
Massachusetts Inst. of Tech., Cambridge.
RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Annual rept. no. 5, 1965-66,
by Charles H. Townes. Apr 66, 442p
Contract SD-90
See also AD-435 880.

Descriptors: (*Materials, Scientific research), (*Reports, Materials), Solid state physics, Physical chemistry, Electrical properties, Magnetic properties, Optical properties, Semiconductors, Metallurgy, Mechanics, Chemical engineering, Quantum theory, Crystallography, Polymers, Radiation damage.

This is the fifth Annual Report on Research in Materials Science and Engineering at the Massachusetts Institute of Technology. Topics included are chemical and solid state physics; electric, magnetic, and optical properties of materials and applications to devices; metallurgy and materials science; and materials engineering.

AD-632 786 **Field 5A**
CFSTI Prices: HC$6.00 MF$1.25
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
REPORT ON RESEARCH, 1 JULY 1964 - 30 JUNE 1965.
Jul 65, 203p ARL-65-160

Descriptors: (*Air force research, Reviews), Mathematics, Physics, Solid state physics, Chemistry, Metallurgy, Ceramics, Plasma physics, Thermodynamics, Fluid mechanics.

The report is a general accounting devoting a section to each laboratory within Aerospace Research Laboratories. It includes information of all research pursued and accomplished, both in-house and through ARL contracts, during fiscal year 1965. (Author)

AD-632 990 **Field 5A, 16A, 13F, 13M, 22D, 13B, 13D**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
PROTECTIVE STRUCTURES AND COMPONENTS: COMPILATION OF ABSTRACTS.
Rept. no. 18 on ATD work assignment no. 13,
by Victor Klein. 28 Mar 66, 18p ATD-66-29
TT 61262
Based on Soviet-Satellite open sources pub. 1965. Rept. on Surveys of Communist World Scientific and Technical Literature.

Descriptors: (*Transportation, Abstracts), (*Launching sites, Abstracts), (*Packaging, Abstracts), Railroads, USSR, Structures, Machines, Petroleum, Hoists, Pipes, Arctic regions, Preservation, Storage.

Contents: Facilities; Transportation; Launch site; Packaging, preservation, and storage.

AD-632 993 **Field 5A, 5C, 13H, 5D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
BIBLIOGRAPHY ON AUTOMATION AND TECHNOLOGICAL CHANGE AND STUDIES OF THE FUTURE,
by Annette Harrison. May 66, 21p P-3365

Descriptors: (*Automation, Bibliographies), (*Economics, Automation), Computers, Education, Commerce, Labor, Political science, Management engineering, Employment.

The paper comprises a list of works collected for two ongoing projects: Automation and Technological Change, and a related informal study of future national and international problems. The purpose of the bibliography is to make this information available to people interested in these areas.

AD-633 069 **Field 5A**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE WORLD OF PROGRAM BUDGETING,
by G. H. Fisher. May 66, 31p P-3361
A talk presented to a conference on program budgeting and cost analysis, University of California, Los Angeles, June 2, 1966.

Descriptors: (*Management planning, *Budgets), Department of Defense, Transportation, Uncertainty, Cost effectiveness, Costs, Decision making, Federal budgets, Systems engineering.

Identifiers: Cost-utility analysis, Program budgeting.

Major characteristics of a program budgeting system are listed as structural or format aspects, the analytical processes, and the data or information systems applicable. Guidlines to be followed in carrying out a cost-utility analysis are: proper structure of the problem and design of the analysis; conceptual framework (fixed utility or fixed approach); building the analytical model; treatment of uncertainty; treatment of problems associated with time; validity checking, and qualitative supplementation. Illustrations of program budget formats are given for the Department of Defense and for transportation.

AD-633 105 **Field 5A, 4B, 20E, 20B,**
CFSTI Prices: HC$3.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
FOREIGN SCIENCE BULLETIN, VOL. 2, NO. 5.
May 66, 54p
TT 66-61271
A Monthly Review of Selected Foreign Scientific and Technical Literature, see also AD-627 431.

Descriptors: (*Scientific research, Reviews), Lasers, Single crystals, Crystal growth, Atmosphere, Illumination, Radio astronomy, Radiation damage, Diodes (Semiconductor), Magnetic fields, Antimony compounds, USSR, Polymerization, Marine geology, Terrestrial magnetism, Symposia, Information theory, Lightning, Meteorological instruments.

Contents: laser with a nonresonant feedback, growth of silicon carbide single crystals, observations of sky-illumination phenomena from spaceships, RT-15 radio telescope, the effect of nuclear reactor radiation on the operation of a cesium diode, a 625-KJ capacitor bank for the production of high-intensity magnetic fields, tris (trialkylsilyl) antimonites, polymerization of monomers complexed and organized along certain patterns, ultrabasic rocks from the bottom of the Indian Ocean, session of the department of general and applied physics of the Radiotechnical Institute, seminar on magnetic-telluric methods of studying the earth's crust and mantle, information scanning systems, the enigma of ball lightning, operation and repair of meteorological instruments.

AD-633 206 **Field 5A, 5E, 13H**
CFSTI Prices: HC$4.00 MF$0.75
Texas Technological Coll., Lubbock. Dept. of Industrial Engineering.
AN INVESTIGATION OF PRODUCTION RATE, IN-PROCESS INVENTORY, AND PRODUCTION QUALITY OF AN ASSEMBLY OPERATION.
Master's thesis,
by Thomas P. Hancock. May 66, 118p
Contract AF 33 (608)-1285

Descriptors: (*Industrial production, *Human engineering), (*Management engineering, Industrial production), Production control, Inventory, Quality control, Operators (Personnel), Programming (Computers), Analysis of variance, Performance (Human), Operations research.

Identifiers: Industrial engineering.

This was a study of a man controlled assembly operation with Poisson arrivals. The height for the work surface, relative to the seated operator, was varied for nine operators with production time, queue length, outgoing quality, and the distribution of service times being observed. The work surface height did not affect, significantly, any of the dependent variables. The general trend indicated that the optimal height in terms of production time and queue length seems to be the height with the elbow two inches above the work surface. Also, it was found that a significant interaction between work surface heights and subjects indicates that, in terms of quality, different subjects perform better at different heights. Subjects did have a significant affect on all these variables. Within the limits of this research, 98.1 percent of the 108 service time distributions were skewed positively and were more peaked than the normal distribution. In addition, there was a high positive correlation between skewness and kurtosis. (Author)

AD-633 281 **Field 5A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
COMMENTS ON THE USE OF ACCOUNTING IN INTERNAL DECISION MAKING.
Management sciences research rept.,
by A. Charnes, and W. W. Cooper. Apr 66, 23p
MSRR-75
Contract Nonr-760 (24),
Proj. NR-047-048
Prepared in cooperation with Northwestern University under contract Nonr-1228 (10), Proj. NR-047-021, and Contract DA-31-124-ARO (D)-322, SRM-151.

Descriptors: (*Management engineering, *Decision making), (*Budgets, Management control systems), O;perations research, Mathematical models, Systems engineering.

Identifiers: Accounting.

The report discusses a series of actual uses of accounting as reported by company officials to a conference at Ohio State University. It also appraises methodologies and accompanying points of view from standpoints of evolving methodologies in computers, mathematical models, operations research and systems approaches. (Author)

AD-633 336 **Field 5A, 5D, 14A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A WORD ON OPTIMAL PATENT LIFE,
by Fred D. Arditti. May 66, 9p P-3369

Descriptors: (*Industrial research, Patents), (*Patents, Life expectancy), Effectiveness, Economics, Optimization, Law.

A variable patent policy is not a panacea for lagging industrial research. It is unlikely that the implementation of such a program will increase the amount of basic research done by industry. Such a policy only stimulates that research which firms believe will produce a product which is marketable and patentable; it does so by promising to the firm capable of doing the R and D the full recovery of all R and D costs plus some incentive profit. In accomplishing this, it minimizes the undesirable effects which accompany the monopolistic position provided by a patent. In short, it reduces the social costs of stimulating research while it reaps many of the social benefits from research that might be foregone under a fixed patent life policy. (Author)

AD-633 338 **Field 5A, 5C, 5D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RESEARCH POLICIES IN INTERNATIONAL PERSPECTIVE: A TIME FOR REAPPRAISAL,
by Arnold Kramish. May 66, 12p P-3372
Prepared for presentation at Gordon Research Conference on Formulation of Research Policies, Santa Barbara, Calif, 31 Jan-4 Feb 66.

Descriptors: (*Research program administration, *Foreign aid), (*Economics, Research program administration), Scientific research, United Nations, Foreign policy.

Identifiers: International cooperation.

N66-18352 **Field 5A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
LANGLEY MANAGEMENT OF A NASA RELIABILITY AND QUALITY ASSURANCE PROGRAM,
by S. P. Leonardy. 1965, 20p NASA-TM-X-56200
Presented at the Ann. Quality Control Clinic of the Am. Soc. for Quality Control, (14th) Minneapolis, Feb 2, 1965.

Descriptors: *Nasa program, *Product development, *Quality control, *Contractor, *Engineering develop ment, *Reliability.

AD-633 205 **See Field 13H**

AD-633 256 **See Field 14A**

AD-633 257 **See Field 5C**

AD-633 282 **See Field 12B**

AD-633 337 **See Field 5C**

PB-169 690 **See Field 14B**

PB-170 087 **See Field 5C**

PB-170 127 **See Field 5C**

PB-170 136 **See Field 5C**

PB-170 156 **See Field 5C**

PB-170 197 **See Field 5C**

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-633 279 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
Office of Naval Research, Washington, D. C. Project LEX.
DOD MANUAL FOR BUILDING A TECHNICAL THESAURUS.
Apr 66, 28p
Proj. MISC-0359
ONR 25

Descriptors: (*Subject indexing, Dictionaries), (*Information retrieval, Dictionaries), Classification, Instruction manuals, Vocabulary.

Identifiers: Engineers Joint Council, Thesauri, LEX Project, COSATI Subject Category List, Descriptors, Hierarchy, KWIC index.

Guidelines and conventions are presented for the selection of appropriate technical subject indexing and retrieval terminology and the display of this terminology in a thesaurus format. These conventions were developed by Project LEX, the DoD technical thesaurus task force, in cooperation with the Engineers Joint Council. A discussion is given of (1) the criteria for determining the usefulness of prospective thesaurus terms or 'descriptors,' (2) means of resolving ambiguities among descriptors, and (3) methods for systematically creating a cross reference structure that will display hierarchical and conceptual interrelationships. The thesaurus format comprises five main sections, (1) an introductory statement explaining the purpose of the thesaurus and the way in which it is arranged, (2) an alphabetical listing of all descriptors and cross references, (3) descriptors arranged by subject categories based on the COSATI Subject Category List, (4) a graphic display of hierarchical relationships, and (5) a permuted display of all descriptors in the order of each meaningful word. (Author)

AD-633 303 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
CONTINUATION OF THE SMALL-SCALE OPERATION OF A TRANSDUCER INFORMATION CENTER.
Final technical rept., 1 Apr 65-31 Mar 66,
by W. E. Chapin, G. L. McCann, and W. H. Veazie.
Apr 66, 37p
Contract AF 33 (615)-2532,
Proj. AF-8222,
Task 822203
AFFDL TR-66-66
Continuation of Contract AF 33 (615)-1819.

Descriptors: (*Information retrieval, Transducers), (*Technical information centers, *Transducers), Data storage systems, Reports, Data processing systems.

The project involved the collection and processing of all categories of transducer documents, data, literature, and reports into a storage-and-retrieval system. The Center made this information available to the transducer technological community on request by publishing accessions lists of abstracts, research-contract compilations, and a summary report on force transducers. Members of the Center implemented the program by visiting with manufacturers and users of transducers to discuss program objectives and to describe the nature of services, both technical and nontechnical, that were available to them. Over 350 requests for technical and nontechnical assistance were handled by specialists assigned to the Center. In its third year as a small-scale transducer information center, the TIC has experienced a significant growth in number and types of services, and the users have expressed pronounced enthusiasm and satisfaction with the operation. (Author)

AD-633 354 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C. Center for Computer Sciences and Technology.
FILE ORGANIZATION FOR A LARGE CHEMICAL INFORMATION SYSTEM.
Final rept. May 64-Dec 65,
by Ruth Anderson, Ethel Marden, and Beatrice Marron. 19 Nov 65, 26p

Descriptors: (*Data processing systems, *Chemistry), Information retrieval, Documentation, Data storage systems, Programming languages, Computers.

Identifiers: LISP.

The report describes a file structure which combines list-processing concepts (for handling variable length information records) with standard serial record arrangements (for identification information). The file organization was designed for a large chemical information system and includes both well-structured and unstructured (amorphous) information. An investigation was made of representative data inputs from the Department of the Army. The data to be put into the file, the nature of the file structure, and the necessary programs for manipulation of file information were considered as interdependent parts of a total system. Computer programs were initiated to test the validity of the proposed approach. (Author)

N66-10608 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Electric Corp., Baltimore, Md. Defense and Space Center.
NASA INDUSTRIAL APPLICATIONS STUDY. INDUSTRIAL REVIEW FOR IMPROVED ELECTRODE FOR BIOPOTENTIAL MEASUREMENT AT THE SKIN,
by H. Schneid. 8 Dec 64, 12p
Contract NASw-952
NASA CR-67798

Descriptors: *Human body, *Measuring apparatus, *Bioinstrumentation, *Electrode, *Skin (Biol).

N66-16157 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
1965 PUBLICATIONS BY MATERIALS DIVISION,
13 Jan 66, 25p NASA-TM-X-53378

Descriptors: *Alloy, *Bibliography, *Composite material, *Materials science, *Explosive, *Propellant sensitivity.

PB-169 212 **Field 5B, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Princeton Univ., N. J. Statistical Techniques Research Group.
FINAL REPORT UNDER GRANT NO. G-22108,
by Clara Feller and John W. Tukey. 1963, 44p
Grant NSF-G22108
Work is continuing under Grant NSF-GN-297.

Descriptors: (*Subject indexing, Effectiveness), Documentation, Statistical analysis.

Identifiers: Citation index, Permuted-title indexes.

This report is essentially an interim report rather than a final report. The work is continuing under a further grant. The main tasks are still in progress. The work reported briefly involves three distinctive elements each of which is essential to its satisfactory functioning: Central editing and research operations at Princeton University. Collection of basic data by some thirty individuals or groups spread from Australia to England, conducted on a wholly volunteer basis. Card punching and certain aspects of computer programming and computer operations, conducted at, and supported by Bell Telephone Laboratories. A clear understanding of these points is essential to an understanding of the discussion presented.

UCRL-14473 **Field 5B, 6C, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
DESIGN AND CONSTRUCTION OF AQUARIUMS A BIBLIOGRAPHY,
by Charlie M. Pierce. 28 Jul 65, 8p
Contract W-7405-eng-48

Descriptors: (*Bibliographies, Structures), (*Aquatic animals, Housing).

Identifiers: Aquariums.

AD-633 388 **See Field 20L**

PB-169 329 **See Field 12A**

5C. ECONOMICS

AD-633 235 **Field 5C**
RAND Corp., Santa Monica, Calif.
SOVIET NATIONAL INCOME AND PRODUCT, 1958-1962: PART II. NATIONAL INCOME AT FACTOR COST AND CONSTANT PRICES,
by Abraham S. Becker. May 66, 212p RM-4881-PR
Contract AF 49(638)-1700

Descriptors: (*Economics, *USSR), Costs, Distribution (Economics), Money, Budgets, Government (Foreign), Agriculture, Industrial production.

Identifiers: Gross national product, Income.

The second and concluding part of a study of Soviet national income in 1958-1962. Part I (AD-616 306) presented estimates of national income at actual (or established) prices of the respective years. Part II adjusts the estimates at established prices for distortions in the Soviet price system, in effect revaluing output at factor cost, and deflates both the established-price and factor-cost estimates for changes in the general price level. The revalued data at current factor cost are discussed in terms of changes in the structure of resource use, while the estimates at constant prices serve for analysis of economic growth. The calculations are compared with official Soviet claims and with estimates of other non-Soviet studies. Some implications of the author's results are considered in relation to the problem of the slowdown of Soviet growth. (Author)

AD-633 257 **Field 5C, 5A**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE FUTURE OF THE NOT-FOR-PROFIT CORPORATIONS,
by Bruce L. R. Smith. May 66, 37p P-3366

Descriptors: (*Industrial relations, *Government procurement), (*Economics, Industrial relations), (*Commerce, Industrial relations), Management engineering, Operations research.

Identifiers: Not-for-profit corporations.

The purpose of this essay is to present a brief analysis of the nonprofit corporation role with a view to clarifying some of the policy questions at issue. The emphasis will be more on formulating the right questions than attempting authoritative answers. With a clearer understanding of the origins of the not-for-profit corporations, the different uses to which the device has been put, and the actual as opposed to the imagined failings or achievements, it should be possible to assess more realistically how this organizational form may evolve in the American governing system (and whether it should be desired to encourage or discourage any particular evolution). (Author)

AD-633 335 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
BOOK REVIEW: 'COMMUNIST CHINA'S ECONOMIC GROWTH AND FOREIGN TRADE'. BY ALEXANDER ECKSTEIN,
by Edwin F. Jones. May 66, 4p P-3373
Prepared for publication in 'Problems of Communism'.

Descriptors: (*China, *Economics), (*Commerce, China), Communism, Foreign policy, Handbooks, Reviews.

The volume examines Chinese economic development with special reference to its support of Chinese foreign policy and to the role of foreign trade. It places the economic events of the past 16 years in an analytical framework which provides a proper dynamic perspective on the current problems confronting China and the economic underpinnings of its foreign policy.

AD-633 337 **Field 5C, 5A, 8F**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
BOOK REVIEW. "INTERNATIONAL DIFFERENCES IN INDUSTRIAL STRUCTURE". BY JOE S. BAIN.
by George Rosen. May 66, 4p P-3374
Prepared for publication in ANNALS of American Academy of Political and Social Science, Philadelphia, Pa.

Descriptors: (*Industries, Handbooks), (*Geography, Industries), (*Economics, Industries), (*Management engineering, Industrial research), Industrial plants, Industrial production, Systems engineering, Operations research, Reviews.

The book attempts the comparison of five important characteristics of the structure of large-scale manufacturing industry in eight countries. The characteristics compared are: (1) plant size of industries; (2) concentration of output in plants; (3) efficiency in manufacturing production as influenced by scale of plant; (4) degree of control of individual industries by firms; and (5) the degree of multiplant development by the larger firms in the industry. These comparisons are

carried out for eight different countries of widely differing stages of economic development and with widely different economic structures and resource endowments.

N66-18350 Field 5C
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
INTERACTION BETWEEN SPACE EXPLORATION, SCIENCE, AND TECHNOLOGY,
by H. L. Dryden. 1965, 22p NASA-TM-X-56228
Presented to the AM. Inst. of Aeron. and Astronautics, Minneapolis, Mar 11, 1965.

Descriptors: *Cosmology, *Meteorology, *Space exploration, *Engineering (Gen), *Physical science (Gen), *Technology (Gen).

PB-169 749 Field 5C, 6H, 8F
CFSTI Prices: HC$2.00 MF$0.50
Maine Dept. of Sea and Shore Fisheries, Augusta.
SOFT CLAM DEPURATION STUDIES. CHAPTER I. DESIGN AND OPERATION OF A CLEANSING PLANT. CHAPTER II. LABORATORY STUDIES ON SHELLFISH PURIFICATION,
by Bradford Sterl, Paul J. DeRocher, Phillip L.Goggins, John W. Hurst, and Peter B. Mooney.Sep 64, 38p

Descriptors: (*Economics, Maine), (*Maine, Seafood), (*Pelecypoda, Cleaning), (*Seafood, Maine), Shellfish, Purification, Costs, Site selection, Industrial plants.

Identifiers: Area redevelopment.

Summary and conclusions (regarding a pilot commercial depuration operation at Biddleford Pool, Maine): Equipment needed to handle clams through a depuration production line is described. Material cost of this equipment is approximately $2,000. A partially tested sanitary control scheme from the growing area through the depuration plant is described. A hand-operated hydraulic clam harvester is described. Ultra-violet treatment is an efficient means of obtaining large volumes of high-quality sea water for shellfish depuration, with average reduction of 99.9%. Sand filtration through wellpoints is an effective pretreatment reducing coliform bacteria 90%. It is also effective in controlling turbidity. Twenty-six commercial size lots of clams were purified successfully as measured by 2400 MPNs coliforms and 230 MPNs E. coli. Between 2 - 20 C. reduction of bacteria after 24-hours cleansing was approximately 90%, using E. coli as an indicator. There was no apparent difference in cleansing rates of clams between those drained and flushed and those not after 24-hour cleansing. There was no apparent difference in cleansing rate between clams in a single layer and clams from depths up to six inches. (Author)

PB-169 751 Field 5C, 13B, 8F
CFSTI Prices: HC$7.00 MF$1.75
Gould (William A.) and Associates, Cleveland, Ohio.
EVALUATION OF VACANT INDUSTRIAL BUILDINGS AND LAND AND THEIR POTENTIAL. APPENDIX III. DISPLACEMENTS AND ECONOMIC BACKGROUND.
29 May 65, 384p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. ,

Descriptors: (*Economics, Ohio), (*Ohio, Industries), (*Site selection, Industries), (*Industries, Ohio), Urban planning, Industrial plants, Employment, Urban planning, Factories, Warehouses, Industrial equipment, Buildings.

Identifiers: Area redevelopment.

A study was made of the problem of industrial growth and relocation in the Cleveland urban area. The project was instigated, to a considerable extent, by the problem of 'hard core' unemployment. It was felt that there was a need to define the characteristics of vacant industrial buildings in this area -- in order to determine if Cleveland is in a favorable position to retain industries that will be displaced by urban renewal, highways, and other public improvement programs. There was also an implied need to study the industrial climate of Cleveland, to determine its relationship to the buildings and land available for industrial expansion and relocation. The question was raised as to whether there is an available 'bank' of industrial facilities and land suitable to support relocation and growth of industry in the near future (to 1970). Conclusions are presented concerning the characteristics of the industrial facilities within the city and the market for those facilities. The various major segments of the study are presented: building vacancies and their characteristics, undeveloped land, displacements and economic background, and evaluation standards and feasibility studies.

PB-169 786 Field 5C, 8F
CFSTI Prices: HC$5.00 MF$1.00
Development Planning Associates, Inc., San Francisco, Calif.
INDUSTRIAL AND COMMERCIAL POTENTIALS AND SITE PROJECT ANALYSIS, BRAXTON, CLAY AND NICHOLAS COUNTIES, WEST VIRGINIA.
Aug 65, 157p

Descriptors: (*Site selection, West Virginia), (*Economics, West Virginia), (*West Virginia, Economics), Industries, Natural resources, Terrain, Population, Employment, Water supplies, Dams, Transportation, Commerce, Coal, Mining engineering.

Identifiers: Area redevelopment, Tourist industry.

In order to benefit from the momentum of economic resurgence, the presence of the two reservoirs, and the impact of improved accessibility, the three counties will need to prepare for increased industrial development and commercial activity. Most of the communities in the three-county area have already undertaken some preparations, including civic improvements, land use planning programs, and the organization and funding of local development corporations. A major remaining need of the area has been the identification and development of suitable sites for industry, and of additional visitor attractions to complement the Sutton and Summersville Reservoirs. Technical assistance in the provision of prime industrial sites in Braxton and Nicholas Counties, and outstanding tourist attractions in Clay County, has been the major undertaking of this study.

PB-169 795 Field 5C, 8F
CFSTI Prices: HC$1.00 MF$0.50
Nathan (Robert R.), Associates, Inc., Washington, D. C.
FIELD RECONNAISSANCE OF PARTICIPATION BY MICHIGAN GROUPS IN UPPER PENINSULA TECHNICAL ASSISTANCE PROJECT.
Rept. for 16-20 Jul 62,
by Edward D. Hollander and David L. Chewning.
20 Jul 62, 16p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Michigan), (*Michigan, Economics), Industries, Universities, Natural resources, Costs, Feasibility studies, Mining engineering, Forestry, Recreation, Ores (Metal sources).

Identifiers: Area redevelopment.

The trip was undertaken for the purpose of inquiring into the extent and character of participation by Michigan groups involved in the project for technical assistance to aid economic development programming in the Upper Peninsula of Michigan. More specifically, the reconnaissance was carried out for the purpose of exploring with officials of the State of Michigan and of its agencies, and with community organizations and leaders of the UP: (1) the nature and extent of their organizational and institutional resources for economic development programming and execution; (2) their need for outside technical assistance and their expectations of how it might serve them; (3) the circumstances and relationships within which technical assistance might function; and (4) the feasibility of various approaches to the project.

PB-169 885 Field 5C, 5D
CFSTI Prices: HC$6.00 MF$1.25
International Customs Tariffs Bureau, Brussels (Belgium).
PORTUGAL.
Dec 60, 265p
Supplements 1-3 to No. 9 (8th ed.)

Descriptors: (*Portugal, Economics), (*Economics, Portugal), (*Commerce, Law).

Identifiers: Customs laws; Tariffs.

Contents: Tariff regimes; special regime; tariff of import duties.

PB-169 898 Field 5C, 5I
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
COMPENDIUM OF TRAINING PROGRAMS.
Preliminary ed.
May 66, 38p STS-102

Descriptors: (*Industries, Training), (*Training, Industries), (*Education, Industries), Engineering, Economics, Management engineering, Indexes, Commerce, Universities.

Identifiers: Technology.

More than one-hundred non-credit educational programs offered in the various fields of industrial technology are described. Included are courses, seminars, institutes, workshops, and conferences which are representative of recent continuing programs offered by colleges and universities, government agencies, and businesses. Entries are arranged aphabetically by the name of the organization presenting the course. The individual courses are numbered consecutively throughout the text and keyed to a subject index. In addition to title, course description, and sponsoring organization, most of the entries contain the price and length of the course.

PB-170 008 Field 5C, 8F
CFSTI Prices: HC$5.00 MF$1.25
Jacknin and Co., Inc., Washington, D. C.
ECONOMIC AND ENGINEERING FEASIBILITY STUDY KEYSER - MINERAL COUNTY INDUSTRIAL PARK, KEYSER, WEST VIRGINIA.
6 Aug 65, 165p
Contract C-165-65
Prepared in cooperation with Ben Dyer Associates, Inc., Riverdale, Md.

Descriptors: (*Economics, West Virginia), (*West Virginia, Economics), (*Industries, West Virginia), Commerce, Feasibility studies, Industrial plants, Site selection, Labor, Employment, Population, Minerals, Wages, Transportation, Natural resources, Power supplies, Water supplies, Wood.

Identifiers: Area redevelopment, Industrial parks.

The report presents concrete recommendations for the engineering and economic development of the industrial park. In addition, pertinent details are presented concerning those economic factors germane to industrial development of the area in general and the industrial park in particular. An analysis is made to identify those industries which

offer the greatest opportunity for growth in the Keyser area, and recommendations for action are suggested which will permit the most rapid economic development of the area. (Author)

PB-170 014 **Field 5C, 8F, 11E**
CFSTI Prices: HC$3.00 MF$0.75
Fantus Area Research, Inc., New York.
AN ECONOMIC FEASIBILITY STUDY OF CHESTERFIELD COUNTY, SOUTH CAROLINA,
by Edwin I. Oppel. 1 Apr 64, 81p
Contract Cc-6990
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, South Carolina), (*South Carolina, Industries), (*Textile industry, South Carolina), (*Industries, South Carolina), Antifriction bearings, Power tion, Feasibility studies, Wages, Beverages, Labor, Natural resources, Transportation, Distribution (Economics), Commerce, Water supplies.

Identifiers: Area redevelopment.

Many types of light metalworking comply with the combination of location factors. However, industries making textile machinery or parts are particularly attractive. The contractor's investigations led him to identify the anti-friction materials and bearings industry as one which should find a Chesterfield County location highly desirable. Coincident with the submittal of this report, a large company has selected Cheraw, South Carolina as a site for the production of antifriction material and bearings. The contractor presents no recommendations for the new industry location project, since all implementation steps have already been taken. To implement the expansion of existing industry through local action, the contractor recommends that: (1) First priority of action be assigned to the knit goods industry; second priority be assigned to the two apparel firms; third priority be assigned to the local winery. (2) The Chesterfield County Redevelopment Committee, rather than the individual communities, should be given responsibility for action.

PB-170 015 **Field 5C, 11L, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Mississippi State Univ., State College. Bureau of Economic Research.
THE GENERAL ECONOMIC CONDITION AND FEASIBILITY OF SELECTED INDUSTRIES IN MOUND BAYOU, MISSISSIPPI,
by Guy T. Peden, Jr. 1 Jul 65, 202p
Prepared in cooperation with Area Development Administration, Washington, D. C.

Descriptors: (*Economics, Mississippi), (*Industries, Mississippi), (*Mississippi, Industries), (*Wood, Industries), Cotton, Labor, Containers, Employment, Feasibility studies, Natural resources, Forestry, Water supplies, Commerce, Power supplies, Labor, Industrial plants, Costs.

Identifiers: Area redevelopment, Furniture.

The town of Mound Bayou, Mississippi, is located in the center of an agricultural region that has heretofore relied almost exclusively on the production of cotton to provide employment for its labor force. In recent years, the cultivating and harvesting of cotton has become increasingly mechanized, leaving many farm laborers unemployed or underemployed. In a survey of the business conditions and economic resources in Mound Bayou, it was determined that three industries appeared best suited for the conditions found there. The wooden container industry is shown to be a declining industry with a considerable amount of excess capacity at the present time and with no prospects for improvement in the near future. It was concluded that no further consideration should be given to developing a wooden container plant. The furniture manufacturing plant offers the most opportunity and benefits for Mound Bayou. The demand for upholstered furniture is shown to be increasing, with an increasing need for additional plants. In addition, a furniture plant should eventually employ a minimum of 100 employees, remaining industry--a handle manufacturing plant--is also shown to be feasible, but the opportunity and benefits are less substantial than the furniture plant.

PB-170 019 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Rosenstock-Holland-Associates, Akron, Ohio.
FEASIBILITY SURVEY REPORT (TECHNICAL AND ECONOMIC) OF PROPOSED LAKEFRONT DEVELOPMENT CONNEAUT, OHIO,
by Matthew J. Rosenstock. 2 Jul 65, 136p
Contract C-159-65

Descriptors: (*Economics, Ohio), (*Ohio, Economics), (*Recreation, Economics), Pennsylvania, Costs, Boats, Piers, Feasibility studies, Lakes, Harbors, Rivers, Population, Commerce, Employment.

Identifiers: Area redevelopment, Tourist industry, Marina, Recreation facilities.

The objectives of this study has been: A. To conduct an in depth study of the market potential in Northeastern Ohio and Pennsylvania for water oriented recreational facilities. B. Based upon these findings, to develop preliminary plans that accomplish the desired results. C. Effect an economic study of costs, revenue, and methods of financing. D. Determine a measure of benefits, bgh direct and indirect, to be derived. Pleasure boating recreation is the basis for all of the facilities contemplated. Permanent dockage desire and physical space provide the yardstick for the determination of the size of development and extent and character of supporting facilities. The market study reveals, upon close examination of the results by established methodology, that: A. In the year 1965, there is an indicated demand for 2125 permanent berths, and projected to 1967, it will be 15% greater or 2,444. B. There are 298 berths available at present. C. There is an existing deficiency of 1,827 desired berths, and a 1967 deficiency of 2,146. The plans developed provide approximately 769 spaces for the Ashtabula project and 1,011 for the Conneaut development, or a total of 1,780 for both. It is clearly apparent that both of the sites, fall 366 spaces short of filling the 1965 demand, and assuming full development by 1970, would fall short of the projected demand by almost 1,500 spaces. By 1970, both developments would satisfy only 55% of the indicated demand. (Author)

PB-170 020 **Field 5C, 8F**
CFSTI Prices: HC$6.00 MF$1.50
Wolf Management Services, New York.
INVESTMENT OPPORTUNITIES IN SOUTHEASTERN ALASKA.
1964, 250p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Alaska), (*Employment, Alaska), (*Industries, Alaska), (*Alaska, Economics), Roads, Transportation, Commerce, Population, Wages, Cost, Labor, Forestry, Natural resources, Construction, Water traffic, Mining engineering, Agriculture, Wood, Rock (Geology).

Identifiers: Area Redevelopment.

The origin of this report may be found in a condition of 'substantial and persistent' unemployment in the region it describes. To help reduce the incidence of unemployment is therefore its principal objective. The State of Alaska and its Southeastern ('panhandle') region had been studied before with a similar objective, and a number of earlier reports exist which appraise its economy, cite its disadvantages, describe its potential and project its future with industrial development, hence job opportunities, their goal. This study differs from earlier ones, however, in four important respects: It is the only one to be commissioned and completed since the Marine Highway Ferry Service linked Southeastern Alaska cities with each other and with the 'outside',; It is the only one to consider industrial development in business terms; i.e., the viability of investments; It is the only one charged with the responsibility of delineating specific business opportunities; and It is the only one with a short-range focus...the industry opportunities it describes are not for years ahead, but for now. (Author)

PB-170 023 **Field 5C, 6H, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Southeastern Massachusetts Technological Inst., New Bedford. Research Foundation.
THE TECHNICAL STUDY OF THE SCALLOP AND FLOUNDER INDUSTRY OF NEW BEDFORD, MASSACHUSETTS.
Implementation rept.
1965, 18p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Massachusetts), (*Massachusetts, Seafood), (*Seafood, Massachusetts), Fishes, Processing, Industries, Education, Labor, Industrial plants, Piers.

Identifiers: Area redevelopment, Food industry.

In September of 1961, The New Bedford Institute of Technology, now Southeastern Massachusetts Technological Institute, received a grant for the study of the scallop and flounder industry of New Bedford. In August of 1963, the technical phase of this study was completed and published with the title, 'A Technical Study of The Scallop and Flounder Industry of New Bedford, Massachusetts'. The purpose of this report is to evaluate the degree and number of recommendations from the Study which have been executed since December, 1963. Another, though auxiliary purpose, is to determine the economic impact on the community of those recommendations adopted. The difficulty with the auxiliary purpose if that, at best, the conclusions will seem nebulous: the reasons for the indeterminate character of the economic impact is that either none of the recommendations have realized their full potential or they have not been in operation for a sufficient amount of time in order than an absolute economic evaluation could be derived.

PB-170 025 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Herkenhoff (Gordon) and Associates, Albuquerque, N. Mex.
DEVELOPMENT PLAN OF RECREATION FACILITIES FOR NAVAJO LAKE STATE PARK.
Jun 65, 92p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, New Mexico), (*New Mexico, Economics), (*Recreation, Economics), Rivers, Natural resources, Employment, Lakes, Costs, Sewage, Roads, Boats, Population, Water supplies, Dams, Geology.

Identifiers: Area redevelopment, Recreation facilities, Marina.

Construction of all facilities enumerated in the preliminary report has been justified. Section III of this report presents the initial development program. Additional facilities shown in Section IV will be constructed as required to satisfy demand. While estimated revenue production of several facilities included in the initial program fail to justify their cost directly, they are required to create a complete and balanced recreation resource. Their importance to the fiscal aspect of the program lies in the induced effect they will have on revenue production by other facilities. Based on the foregoing we recommend that action be taken to issue revenue bonds to finance construction of

the initial development program as enumerated in Section III of this report. (Author)

PB-170 026 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Hare and Hare, Kansas City, Mo.
PUBLIC AND PRIVATE RECREATIONAL POTENTIALS ON PERIMETER OF SAM RAYBURN RESERVOIR, ANGELINA, JASPER, NACOGDOCHES, SABINE AND SAN AUGUSTINE COUNTIES, TEXAS,
by Richard E. O'Brien and Leonard A. White. 3 Sep 65, 129p
Contract Cc-6010
Prepared in cooperation with Georgia Univ., Athens and Arkansas Univ., Arsenal. Availability: Original document in color until exhausted.

Descriptors: (*Recreation, Texas), (*Economics, Texas), (*Texas, Recreation), Lakes, Dams, Population, Water pollution, Feasibility studies, Costs, Employment, Industries, Roads, Sanitary engineering, Sewage, Water supplies, Natural resources.

Identifiers: Area redevelopment, Recreational facilities, Tourist industry.

The construction of the Sam Rayburn Reservoir establishes the Piney Woods Region of Deep East Texas as a water recreation center of national importance. It will be the largest body of water within the State of Texas, placed in a setting of stately pine forests and wildflowers. The city of Beaumont, Texas, is less than two hours from the Reservoir, while the fastest growing metropolitan center in Texas, Houston, is only three hours by car from the shoreline. (Author)

PB-170 028 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Development Counsellors International, Ltd, New York.
A SURVEY TO DETERMINE THE FEASIBILITY OF A PORT AUTHORITY FOR THE POINT JUDITH-GALILEE AREA OF RHODE ISLAND,
by Don Short and Joseph Cathcart. 1965, 51p
Contract C-266-65
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Harbors, Rhode Island), (*Rhode Island, Harbors), (*Economics, Rhode Island), (*Industries, Rhode Island), Feasibility studies, Commerce, Recreation, Employment, Piers, Scientific research, Seafood, Natural resources, Roads, Industrial plants.

Identifiers: Area redevelopment, Recreation facilities, Tourist industry.

The project involved an economic study of the Pt. Judith-Galilee-Jerusalem area, the Pt. Judith Pond, Potter Pond and contiguous areas of the towns of Narragansett and South Kingstown. An investigation in depth was made of present conditions, impediments to economic development in the past, local attitudes, means for accelerating development of facilities and improvement of employment, factors favorable to specific types of industrial, commerical and recreational development and analysis of the means by which such development could be achieved. The scope of work involved analysis of the problem of feasibility of a Port Authority on the basis of present and potential income from port facilities and services. (Author)

PB-170 032 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Wasatch Mountain State Park Project, Utah.
HEBER VALLEY APPLICATION.
1966, 7p

Descriptors: (*Economics, Utah), (*Utah, Economics), (*Recreation, Utah), Mountains, Natural resources, Employment, Roads, Forestry.

Identifiers: Area redevelopment, Recreation facilities.

The Wasatch Mountain State Park area when developed will help to alleviate the local and national recreation crisis and will constitute a valuable renewable resource to Wasatch and surrounding counties and the State of Utah. (Author)

PB-170 037 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Aguar, Jyring and Whiteman, Duluth, Minn.
TOURIST AND RECREATIONAL RESOURCES, GRAND PORTAGE INDIAN RESERVATION, MINNESOTA,
by Charles E. Aguar, J. William Trygg, and James W. Clark. Apr 63, 89p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, Minnesota), (*Minnesota, Economics), (*Recreation, Minnesota), Culture, Natural resources, Employment, History, Commerce.

Identifiers: Area redevelopment, Indians, Indian reservations, Recreation facilities.

The Grand Portage Band Council established certain goals that were kept foremost in mind in preparing the study. The goals are as follows: (1) Preservation of wilderness and historic values and the native charm of the reservation, consistent with sustained yield forestry practices. (2) Providing employment opportunity for members of the Grand Portage Band. (3) Demonstrating the fact that an Indian community can develop and maintain a self-sustaining local community. (4) Improving living standards, health and general welfare of the Grand Portage Indian Reservation. (5) Working effectively and in harmony with all public agencies in the development of Grand Portage. (6) Pursuing prudent and productive practices in the utilization of the natural resources of the Grand Portage Reservation. (7) Making the Grand Portage Reservation and the Grand Portage National Monument one of the most outstanding historical and recreational areas of the nation. (Author)

PB-170 038 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Aguar, Jyring and Whiteman, Duluth, Minn.
TOURIST AND RECREATIONAL RESOURCES LAC DU FLAMBEAU INDIAN RESERVATION WISCONSIN,
by Charles E. Aguar. Nov 64, 22p
Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, Wisconsin), (*Wisconsin, Economics), (*Recreation, Wisconsin), History, Culture, Commerce, Forestry, Employment, Natural resources, Minnesota, Lakes, Feasibility studies.

Identifiers: Area Redevelopment, Indian reservations, Tourist industry, Recreational facilities.

Contents: Part I - Background; Part II - Recommendations; Classifying the recreation resources, General Outdoor recreation areas, Historic and cultural sites, Part III- Market and demand; Delineation of the market, Future demand potential, Chequamegon national forest visitations, Lac Du Flambeau visitations, Part IV - Action program; Continued planning, Immediate action, Recommended five year capital improvement program, Projections of use, income and jobs, Part V - Resource inventory; Natural features, Tourist and recreational facilities, Human resources.

PB-170 040 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Armour Research Foundation, Chicago, Ill.
A SURVEY OF TOURIST POTENTIAL AND ADEQUACY OF WATER SUPPLY FOR TOURISM ON THE HOPI INDIAN RESERVATION.
Final rept.,
by John Morey. 31 May 63, 109p P-024

Descriptors: (*Economics, Arizona), (*Arizona, Economics), (*Recreation, Economics), Traffic, Natural resources, History, Culture, Terrain, Roads, Water supplies, Sandstone, Employment, Labor, Geography, Commerce.

Identifiers: Area redevelopment, Tourist industry, Indian reservations, Indians, Arts and crafts, Recreational facilities.

Summary of findings: I. The hopi tribe is plagued with high unemployment, lack of capital, governmental problems and litigation. II. The hopi reservation contains exploitable tourist resources. III. The hopi tourist attractions are not well developed. IV. The hopi reservation is well situated with respect to major tourist markets but is not participating in their benefits. V. The grand canyon traffic would supply the largest number of reservation tourists. VI. When a traffic volume of 45,500 vehicles annually is achieved it is estimated that tourists will spend $424,000 per year on the hopi reservation. VII. A program of promotional activities and facilities development is recommended. VIII. Motel and restaurant facilities should be developed. IX. Motel water requirements for the tourist complex are within the capability of good wells drilled in the Navaho sandstone. X. The tribe should seek national monument status for the awatovi ruin. XI. Tribal ownership of tourism facilities is not recommended.

PB-170 042 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Plasman (Stephen K.) and Associates, Inc., Minneapolis, Minn.
SHOPPING FACILITY FEASIBILITY STUDY, PINE RIDGE, SOUTH DAKOTA.
Oct 64, 67p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, South Dakota), (*South Dakota, Economics), (*Commerce, South Dakota), Employment, Transportation, Population, Traffic, Roads.

Identifiers: Area redevelopment, Shopping centers.

The essential findings of this investigation are: (1) Present Pine Ridge shopping facilities are inadequate and for some items non-existent. The addition of new shopping facilities will change present shopping habits because of their availability and convenience. (2) The present income level of residents in the trade area results in a larger proportion of family income being spent for food and other convenience goods than is the case in more prosperous areas. (3) The demand exists for additional shopping facilities in Pine Ridge. A facility of about 11,000 square feet is recommended including space for supermarket and bakery, drug store, women's and men's clothing, appliance, department store items, hardware items, shoes, and other goods and services all under one roof. (4) The predicted sales volume of the new shopping facilities is in addition to that obtained by existing competitive facilities in Pine Ridge and White Clay. While shopping facilities in Pine Ridge and White Clay will be affected to some extent, more distant towns and cities will be affected to a greater extent.

PB-170 044 **Field 5C, 13B, 8H, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Army Engineer District, Huntington, W. Va.
SURVEY REPORT ON GUYANDOT RIVER, WEST VIRGINIA, FOR FLOOD CONTROL AND ALLIED PURPOSES.
Feb 62, 92p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*Dams, West Virginia), (*Civil engineering, Floods), (*West Virginia, Dams), Economics, Rivers, Costs, Drainage, Control.

Identifiers: Area redevelopment.

The only economically feasible project providing a high degree of flood protection along the Guyandot River is the Justice Reservoir on the Guyandot River. The project, controlling a drainage area of 512 square miles, would have confined all floods of record to within the stream channel at Logan, and would be of major importance in reduction of floods along the Ohio River. As proposed for best development of the site, this project consists of a rock- and random-fill dam and a reservoir with a total storage of 196,000 acre-feet of which 174,000 acre-feet would be reserved for flood control and 22,000 acre-feet in a permanent (minimum) pool for silt storage and recreation purposes. Three thousand acre-feet of the flood control storage would be used during the months April to November, inclusive, for increase of low flows for water quality control and additional recreation benefit. The estimated cost of the project is $60,500,000, including $23,000 preauthorization costs. Of the total cost, $44,957,000 is for relocations, including a major railroad relocation, and acquisition of lands and interests in lands. The estimated total annual economic costs are $1,898,000, of which $67,000 is for operation, maintenance and major replacements. The total evaluated annual returns for all purposes is $2,140,000, and the benefit-cost ratio is 1.1 to 1. (Author)

PB-170 046 **Field 5C, 2E, 2B, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Oregon State Univ., Corvallis. Agricultural Experiment Station.
BEEF CATTLE FEEDLOTS IN OREGON, A FEASIBILITY STUDY,
by Jack A. Richards and Gerald A. Korzan. Mar 64, 47p Special rept. 170
Prepared in cooperation with Farmer Cooperative Service, Washington, D. C.

Descriptors: (*Economics, Oregon), (*Oregon, Agricul ture), (*Bovines, Food), Costs, Feasibility studies, Processing, Food dispensing, Beef, Cereals, Plants (Botany), Grasses, Employment, Labor, Commerce.

Identifiers: Area redevelopment, Feed, Animal husbandry.

The purpose of this study is to determine whether or not commercial beef cattle feedlots in Oregon are feasible. Costs of building and operating feedlots are shown in detail. Costs and returns are summarized to show the net returns to management on the basis of hundredweight, per head, and for each year.

PB-170 047 **Field 5C, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Spindletop Research, Inc., Lexington, Ky.
INDUSTRIAL, RECREATIONAL, AND TOURISM OPPORTUNITIES IN LYON AND TRIFF COUNTIES, KENTUCKY.
Aug 65, 224p
Contract Cc-6152

Descriptors: (*Economics, Kentucky), (*Kentucky, Economics), (*Industries, Kentucky), (*Recreation, Kentucky), Employment, Costs, Commerce, Trans portation, Power supplies, Minerals, Labor, Wages, Natural resources, Lakes, Site selection, Sanitary engineering.

Identifiers: Area redevelopment, Tourist industry.

This report identifies employment opportunities in Lyon and Trigg Counties, Kentucky. These counties have been affected significantly by two federal projects--Land Between the Lakes (Tennessee Valley Authority) and Lake Barkley (U. S. Army Corps of Engineers). These projects significantly reduce the land area available for private use, but create new employment opportunities. The report identifies the best industrial sites, including layouts and cost estimates, in both counties. Specific employment opportunities in manufacturing and recreation-oriented industries are identified, and recommendations for overall development are made. The study was conducted by Spindletop Research for the Area Redevelopment Administration. (Author)

PB-170 050 **Field 5C, 8I, 8F, 8G**
CFSTI Prices: HC$4.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
LIMONITE DEPOSITS IN CHEROKEE AND ANDERSON COUNTIES, TEXAS. A GEOLOGICAL AND BENEFICIATION INVESTIGATION.
Final rept.,
by William L. Smith and Raymond W. Schatz. 12 Aug 63, 116p
Contract Cc-5958,
Proj. BMI-G-6346

Descriptors: (*Economics, Texas), (*Texas, Ores (Metal sources), (*Ores (Metal sources), Texas), (*Iron, Ores (Metal sources), Economic geology, Mining engineering, Purification, Minerals, Material separation, Silicon compounds, Oxides, Aluminum compounds.

Identifiers: Area Redevelopment, Limonite.

Limonite deposits were explored to determine the approximate quantity and quality of the rock present on leases made available to the Cherokee County Redevelopment Council. Of 78 leases prospected, 35 were selected for drilling and/or closer exploration. Over 500 samples were selected for examination or analysis. Computations indicated that about 7,636,000 short tons (6,818,000 long tons)of limonite are probably present on the leases explored. The deposits range from obviously excellent properties to obviously poor ones. Although there is a large variation in the thickness of the deposits and the depth of overburden, there is a remarkable similarity in the grade of the limonite over the numerous properties explored. Exclusion of certain properties where the limonite appears to be too thin or to be of poor quality leave a balance in excess of the minimum required tonnage. Beneficiation studies were conducted with bulk samples assaying approximately 40 to 45 per cent iron, 14 to 21 per cent SiO2 and 10.0 to 10.6 per cent A12O3. Hand-picking and washing techniques resulted in production of a concentrate of approximately 46 per cent iron, 10.5 per cent SiO2, and 10.0 per cent A12O3, regardless of the original amount of admixed clay and sand. Recovery of iron was in the range of 91 to 97 per cent. Heavy-liquid separation on the coarse fraction of one of these concentrates suggested that further elimination, by physical means, of the silica and alumina is unlikely. (Author)

PB-170 054 **Field 5C, 11F, 8F, 8I**
CFSTI Prices: HC$4.00 MF$0.75
R-N Corp., New York.
PRELIMINARY R-N COMMERCIAL FACILITY PROJECTION AND TECHNICAL REPORT FOR AREA REDEVELOPMENT ADMINISTRATION AND U. S. BUREAU OF MINES ON FIVE LAKE SUPERIOR ORES.
Jun 63, 111p Rept. no. 231
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Ores (Metal sources), Great Lakes), (*Economics, Iron industry), (*Minnesota, Economics), (*Michigan, Economics), (*Wisconsin, Economics), Steel industry, Refining (Metallurgy), Processing, Industrial plants, Site selection, Costs, Effectiveness, Commerce, Labor, Employment, Pellets, Mining engineering, Manufacturing methods, Fuels, Coal.

Identifiers: Area redevelopment.

The pilot plant and laboratory results demonstrating amenability of certain selected Lake Superior region iron ores to treatment by the R-N process for direct reduction in rotary kilns using coals or lignites are presented. Preliminary engineering studies based on these tests and on the extensive experience of the R-N Corporation are included which indicate good economic viability for the application of the R-N process to Lake Superior region ores. Recommendations for more detailed engineering studies are presented. (Author)

PB-170 055 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Western Management Consultants, Inc., Phoenix, Ariz.
THE INDUSTRIAL DEVELOPMENT POTENTIAL OF THE GILA AND SALT RIVER INDIAN RESERVATIONS.
Jun 63, 94p
Prepared in cooperation with Bureau of Indian Affairs, Washington, D. C., and Gila River Indian Community Council, The Salt River Pima-Maricopa Indian Community Council.

Descriptors: (*Economics, Arizona), (*Arizona, Industries), (*Industries, Arizona), Site selection, Geography, Urban areas, Rural areas, Commerce, Distribution (Economics).

Identifiers: Area redevelopment, Indian reservations.

The potential value of lands on the Gila and Salt River Indian Reservations for industrial uses is dependent in large measure upon the character, magnitude, and geographical distribution of industrial growth in the Phoenix Metropolitan Area. If Phoenix continues to grow rapidly both the Salt River and the Gila River Reservations will be favorably affected, although not necessarily at the same time or in the same way. If the metropolitan area experiences any appreciable slow-down in its rate of growth, the industrial development prospects of both reservations will undergo some postponement in time. The Salt River Indian Reservation, because of its location, can be expected to develop earlier and more rapidly than the somewhat more remote Gila Reservation, and to be less seriously affected by possible adverse development in the economy of the metropolitan area. The extent to which reservation development depends upon growth in the Phoenix Metropolitan Area could be reduced if new mineral wealth were discovered on either Reservation, or if technological advances and market changes were to create a significant demand for known deposits of ores or earths. (Author)

PB-170 056 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Surveys and Research Corp., Washington, D. C.
THE ROLE OF TRANSPORTATION IN AREA DEVELOPMENT AND REDEVELOPMENT.
Jan 63, 68p
Contract Cc-5946

Descriptors: (*Economics, Transportation), (*Transportation, Economics), (*Instruction manuals, Transportation), Population, Labor, Roads, Railroads, Air Transportation, Water traffic, Traffic, Costs, Pipes, Employment, Distribution (Economics).

Identifiers: Area Redevelopment Pipelines.

In light of the vital role of transportation in economic development and growth and its importance in furthering the social and cultural life of communities, the Area Redevelopment Administration has designed this manual to serve as a guide to redevelopment authorities in analyzing their transportation needs and planning programs to meet those needs. The manual highlights the importance of transportation as a tool in area development and elaborates procedures for transportation planning and for selecting specific transportation projects, under the following main headings: General Analysis of the Economy as a Basis for Sound Trans-

portation Planning; Examination of Present and Future Demand for Transport; Rates and Services; The Traffic Flow Patterns--Present and Potential; Formulation of a General Plan for Transport Development; and Analysis and Evaluation of Specific Transportation Projects. Also included are a section giving brief descriptions of major sources of financial and technical assistance available to areas concerned with transportation planning and development, and a bibliography of selected publications on the various aspects and modes of transportation.

PB-170 058 **Field 5C, 21D, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Day and Zimmerman, Inc., Philadelphia, Pa.
LIQUID PETROLEUM GAS STORAGE FACILITY AT JIM THORPE, PENNSYLVANIA.
Sep 63, 39p EE-6424-1
Contract Cc-5942
Availability: Original document in color until exhausted. See also PB-170 090.

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Economics), (*Storage tanks, Underground structures), (*Petroleum industry, Pennsylvania), Liquefied gases, Storage, Feasibility studies, Employment, Costs, Commerce, Transportation.

Identifiers: Area redevelopment.

The construction of a one-million-barrel storage terminal would provide almost 30,000 man-days' employment, mostly mining craftsmen, and would require an administrative, operating and maintenance staff of 37 persons. The investigation and review indicate the minimum size terminal to be considered should be the million barrel capacity. The sole revenues of the venture would be derived from the leasing of storage space plus a charge for loading and unloading of the product. The maximum rental within the economics of LPG industry acceptance is 1-1/2 cents per gallon, equivalent to 63 cents per barrel, plus 16 cents per barrel combined loading and unloading charge. The annual revenues based on those charges would be $822,000 for million-barrel capacity. Deductions for operating expenses, fixed charges (interest and amortization of Federal and State loans, and interest on private funds comprising total capital investment) and depreciation computed on the declining-balance method result in income, before taxes, of $68,000 for the first full-year operation. The corresponding amount is estimated to be $383,000 for the fifteenth year, at which time the State loan would be entirely repaid. (Author)

PB-170 059 **Field 5C, 5K, 8F, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Upjohn (W. E.) Inst. for Employment Research, Washington, D. C.
REPORT ON STUDEBAKER - SOUTH BEND,
by Harold L. Sheppard. 13 Mar 64, 29p
Contract Cc-6113

Descriptors: (*Economics, Indiana), (*Indiana, Automotive industry, Indiana), Labor, Employment, Training, Sociology, Sociometrics, Commerce, Industries, Industrial relations.

Identifiers: Area redevelopment.

The immediate steps that were taken to meet the crisis created by the closing of the Studebaker production facilities in South Bend, Indiana, are listed. These included activity by Federal, State, and local agencies and organizations. The following suggestions are made for improved governmental action in such a crisis. (1) Immediate training under the Manpower Development and Training Act and shipment of equipment and machinery should be effected. (2) Limitations in the use of routine methods for utilizing routine programs in such a crisis must be overcome. (3) There should be a prompt survey of the work force displaced with a basic, standardized interview schedule. (4) A running inventory is essential on manpower development prerequisites. (5) Systematic analysis of nation-wide data that would yield 'advance warning' information on industries susceptible of unemployment would be helpful. (6) A blueprint of action is essential for economic crises that will be promulgated by a competent interagency team. (7) Can there be Social Security legislation to provide more adequate benefits to workers approaching retirement. (8) Adequate consideration be given to the timing of a labor market area as eligible for assistance from the Area Redevelopment Administration.

PB-170 061 **Field 5C, 7A, 8F, 21D**
CFSTI Prices: HC$1.00 MF$0.50
Day and Zimmerman, Inc., Philadelphia, Pa.
PETROCHEMICAL FEASIBILITY STUDY, JIM THORPE, PENNSYLVANIA AREA, CARBON SCHUYLKILL INDUSTRIAL DEVELOPMENT CORPORATION.
Addenum 1.
23 Nov 64, 19p EE-6619
Contract Cc-6140

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Chemical industry), (*Chemical industry, Petroleum), Commerce, Transportation, Petroleum, Costs, Feasibility studies.

Identifiers: Area redevelopment.

With the more favorable delivered raw material cost and handling requirements and lower product values, the economic feasibility of the development of a Petrochemical Complex in the Jim Thorpe area becomes only slightly more attractive than originally indicated. The investment returns appear to compare favorably with those generally encountered in the chemical industry. It is believed that participation in such an investment would be most attractive to companies contemplating entry into these markets with 'grass roots' facilities, whereas those already in the field might more economically expand existing capacity. In the course of this study Texas Eastern Transmission Corporation expressed interest in this facility beyond the transportation of raw material to the site. It is suggested, therefore, as an extension of this study that a selected list of companies be contacted indicating to them the results of these studies in digest form. This would provide them with a more quantitative basis for establishing the attractiveness of this project to them. (Author)

PB-170 062 **Field 5C, 11L, 8F, 2F**
CFSTI Prices: HC$5.00 MF$1.00
Little (Arthur D.), Inc., Cambridge, Mass.
OPPORTUNITIES TO INCREASE EMPLOYMENT IN NORTHERN NEW HAMPSHIRE THROUGH HARDWOOD UTILIZATION: (CARROLL, COOS, AND GRAFTON COUNTIES) EXPANSION OF THE PULP AND PAPER INDUSTRY.
23 Jul 65, 187p C-66486
Contract Cc-6146,
Proj. 570

Descriptors: (*Economics, New Hampshire), (*New Hampshire, Employment), (*Paper industry, New Hampshire), (*Employment, New Hampshire), Wood, Wood pulp, Commerce, Processing, Abundance, Costs, Forestry, Natural resources, Transportation, Trees.

Identifiers: Area redevelopment.

As part of a program designed to reduce unemployment and underemployment in the tri-county area (Carroll, Coos, and Grafton Counties) of New Hampshire a study was made to evaluate opportunities to use the area's abundant supply of low-grade hardwoods. One part, conducted by the University of New Hampshire, is concerned with the use of hardwood in products other than pulp and paper. The other part, conducted by Arthur D. Little, Inc., is concerned with the use of hardwood in the manufacture of pulp and paper products. This report details the results of the ADL study. An analysis was made of the availability of wood for a new or expanded pulp and papermaking operation. In analyzing the market, published data was screened to establish a production-consumption ratio in the New England region. A screening program was used to sort out products that could be manufactured from the types of pulpwood prevalent in the tri-county area. The products selected from the screening program were then more fully investigated. We made numerous field trips throughout the region to obtain opinions from potential consumers relative to the advantages and competitive position of a New England-based mill supplying those products.

PB-170 065 **Field 5C, 7A, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Singmaster and Breyer, New York.
FEASIBILITY STUDY OF CHEMICAL INDUSTRY IN SOUTHWESTERN PENNSYLVANIA. PHASE II.
18 Nov 64, 214p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Pennsylvania), (*Pennsyl vania, Economics), (*Chemical industry, Pennsylvania), Site selection, Feasibility studies, Limestone, Calcium compounds, Chlorine, Salts, Sodium compounds, Plastics, Abrasives, Aluminum, Industrial plants, Industrial productions, Carbides, Polyvinyl chloride, Commerce, Transportation.

Identifiers: Area redevelopment.

An integrated development plan should be prepared for a chemical complex to produce polyvinyl chloride and caustic employing a combination calcium carbide and caustic chlorine facility located at Reesedale, Pennsylvania. An integrated development plan should be prepared for a primary aluminum reduction plant located at Reesedale, Pennsylvania. A geologic survey should be undertaken to define the limestone reserves of adequate purity for carbide manufacture and availability at low mining cost near the proposed site at Reesedale, Pennsylvania. A study should be undertaken of the engineering and operational aspects of the use of interruptible electric power for the manufacture of silicon carbide and fused aluminum oxide synthetic abrasives. A test salt well (suitable for future operation) should be driven at the Reesedale site to prove the presence of acceptable salt for a caustic-chlorine plant. (Author)

PB-170 066 **Field 5C, 8I, 21D, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Philgite Co., Inc., Philadelphia, Pa.
THE ECONOMIC FEASIBILITY OF CONSTRUCTING AND OPERATING A CENTRAL COAL CLEANING PLANT IN THE RENOVO AREA CLINTON COUNTY, PENNSYLVANIA.
30 Sep 65, 59p
Contract C-71-65

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Industries), (*Coal, Cleaning), (*Industries, Coal), Industrial plants, Costs, Electric power production, Site selection, Labor, Mining engineering, Transportation.

Identifiers: Area redevelopment.

Conclusions: With an estimated average price of raw coal in the Clearfield, Clinton, Cameron, Elk County area of $3.50, the 175 and 350 TPH plants operating between 77% and 85% and at present 7,000 ton trainload freight rates, in railroad owned cars, is economically feasible for competition in the electric utility coal market of the Philadelphia and New York City areas. The 350 TPH plant can compete with a nuclear generating station in the Philadelphia and New York areas. The economic feasibility of a 350 TPH plant in the Keating - Renovo area is established beyond doubt: a central coal cleaning plant can be operated in the area as a cooperative, preferably by a group of mine own-

ers. The mine owners, or mine operators, could consign their coal to the plant assuring the raw coal supply. Conversely a steady market for their coal would be assured. If the coal cleaning plant is operated as a private company, the suppliers would be paid on a sliding scale based upon the waste - recovery ratio of the plant. The price of raw coal to the supplier would fluctuate and all suppliers would be paid on the same per ton basis, high waste - low price, low waste - high price. Geographically, Renovo is well located with regard to coal production, transportation patterns and access to market. Addenda: A coal cleaning plant was constructed a few miles west of Renovo, near Westport, Pennsylvania, in 1965 by the D. G. Wertz Coal Company of Greensburg, Pennsylvania. This plant processes coal from captive mines near Westport for shipment to eastern utilities. Unit train loading facilities were installed at the plant by the Pennsylvania Railroad Company and put into service in June 1965. (Author)

PB-170 067 **Field 5C, 8I, 8G, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Philgite Co., Inc., Philadelphia, Pa.
MERCER FIRECLAY DEPOSITS IN THE RENOVO, PENNSYLVANIA AREA: A REPORT ON FINDINGS OF GEOLOGIC RECONNAISSANCE AND DIAMOND DRILLING.
23 Sep 65, 70p
Contract C-71-65

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Clay), (*Economic geology, Pennsylvania), (*Clay, Pennsylvania), Mining engineering, Clay minerals, Physical properties, Commerce, Employment, Feasibility studies, Industries, Natural resources, Geological survey, Maps, Chemical analysis, Data.

Identifiers: Area Redevelopment.

Findings obtained from the reconnaissance diamond drilling program conducted in the Renovo, Pennsylvania area indicate that fireclay of sufficient quantity and quality appears to be available as the raw material source of a refractory manufacturer. The favorable areas for clay extraction are indicated on a geologic map as the 'North Boone Road Area' and the 'Drury Ridge Area'. It should be clearly noted at this time that the clay in these areas warrants further testing by diamond drilling on a close spaced drill hole pattern to facilitate delineation of the extent of the higher grade clay. Further diamond drilling would also entail additional chemical and physical analysis.

PB-170 068 **Field 5C, 11L, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Bloch (Ivan) and Associates, Portland, Oreg.
WESTERN MARKETS FOR RED ALDER FROM SPECIFIED COUNTIES IN OREGON AND WASHINGTON.
Oct 64, 61p

Descriptors: (*Economics, Wood), (*Oregon, Econom ics), (*Washington, Economics), (*Wood, Commerce), Industries, Transportation, Forestry, Distribution (Economics).

Identifiers: Area redevelopment, Red alder.

The market for red alder lumber is now about 120 to 140 million board feet per year. This small and growing market is located primarily in the western United States--65 per cent of the total market being in California. A continued growth of the market for red alder lumber is expected at a rate of 5 per cent per year. The markets for red alder lumber are generally characteristic of hardwood markets throughout the United States. Manufacturing consumes at least 85 per cent of the entire hardwood output; the western furniture and fixture industry consuming over 50 per cent of the red alder produced. Two basic marketing methods have been identified. Mill-run marketing of red alder lumber is one method of marketing, which accounts for about 15 per cent of all sales. Marketing of specified grades of red alder lumber is the second basic method, which accounts for 85 per cent of sales. The critical point in marketing highlighted here has to do with the responsibility for market management. (Author)

PB-170 069 **Field 5C, 11L, 2F, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Macdonald Associates, Inc., Washington, D. C.
ECONOMIC AND TECHNICAL EVALUATION OF THE MANUFACTURE AND MARKETING OF SOUTHERN YELLOW PINE STUDS AT NEW WILLARD, TEXAS.
2 Aug 65, 69p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Texas), (*Texas, Economics), (*Wood, Industries), Industrial production, Distribution (Economics), Commerce, Processing, Cutting, Forestry, Natural resources, Labor, Costs, Manufacturing methods, Transportation, Power supplies.

Identifiers: Area redevelopment.

This report provides details of raw material, technical, process, and market considerations that will be encountered in establishing a business enterprise in East Texas to engage in the manufacture of 2 x 4 studs from southern yellow pine sawtimber.

PB-170 070 **Field 5C, 6H, 8F, 13C**
CFSTI Prices: HC$3.00 MF$0.75
New Bedford Inst. of Tech., Mass. Research Foundation.
MATERIAL HANDLING STUDY OF THE NEW BEDFORD FISHERIES PROCESSING PLANTS,
by Conrad P. Richards. 1964, 64p
Contract Cc-5915

Descriptors: (*Economics, Massachusetts), (*Massachusetts, Seafood), (*Seafood, Massachusetts), (*Handling, Seafood), Processing, Industries, Fishes, Costs, Industrial plants, Hoists, Conveyors, Industrial equipment, Manufacturing methods, Buildings, Management engineering.

Identifiers: Area redevelopment, Industrial engineering.

The materials handling study was initiated to produce units of basic information that could be of assistance to individual fish processors who are contemplating an increase in their production. This would be accomplished through an efficient arrangement of material, equipment and personnel to promote this greater production. A study of the layouts of existing plants reveal that: (1) Most buildings used by processors are not suited to overall industry requirements. (2) This is a general failure by processors to adopt and apply line production techniques where applicable. A recommended course of action, intended to eliminate these deficiencies was formulated on the results of an analysis of the processing procedures. The analysis was conducted as follows: (1) A general flow diagram of the industry was utilized to separate processors into their most natural categories of activity. (2) Each category was further subdivided into its operational steps; i.e. operation, movement, storage or inspection. (3) Changes, if deemed necessary, were incorporated into the sample layouts and recommendations. Recommendations are expressed in two forms: written and graphic. The written recommendations are accompanied by graphical sample layouts of both high and low volume complete processing plants.

PB-170 071 **Field 5C, 11L, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY WHITE PAPER MILL.
Oct 62, 63p
Contract Cc-5908

Descriptors: (*Economics, Missouri), (*Missouri, Economics), (*Paper industry, Missouri), Wood pulp, Wood, Paper, Costs, Site selection, Industrial plants, Commerce, Transportation, Forestry, Feasibility studies, Natural resources, Labor.

Identifiers: Area redevelopment.

It is recommended that a 300-ton-per-day capacity mill be established to produce bleached kraft paper suitable for foodboard, greeting cards, printing papers, fine writing paper, index cards, tags, toilet paper, paper towels, or any other good quality bleached paper product. It is expected that such a mill will pay out in 14 years. The principal paper merchants and some of the larger users of white paper stock express definite interest in having a bleached paper mill located in Missouri to supply the Mid-Western market. Analysis of this market indicates current annual sales of about five million tons of white paper. Use of this type of paper is increasing at the rate of 3-1/2 to 4-1/2 percent annually. A mill located in Missouri would offer this market to considerable freight saving as well as improved service. Two mill sites--one near Leadwood in St. Francois County and one near Leeper in Wayne County--are particularly recommended. Both sites have adequate water and minimum conflict with recreational interests. Both sites are surrounded by more than adequate wood supplies and are well located with respect to transportation and utility facilities. Construction and operating costs are expected to be substantially the same at either site. (Author)

PB-170 072 **Field 5C, 8G, 8F, 8I**
CFSTI Prices: HC$5.00 MF$1.00
Georgia Univ., Athens. Dept. of Geology.
EXPLORATION FOR MINERAL DEPOSITS IN HABERSHAM COUNTY, GEORGIA.
Final rept.,
by Vernon J. Hurst and Thomas J. Crawford.
1964, 181p
Contract Cc-5960

Descriptors: (*Economics, Georgia), (*Minerals, Georgia), (*Georgia, Minerals), Asbestos, Rock (Geology), Gold, Granite, Metamorphic rock, Mica, Sulfides, Inorganic compounds, Platinum, Economic geology, Tungsten, Silicates, Aluminum compounds, Iron compounds, Oxides, Chromium compounds, Calcium compounds, Tungstates, Mining engineering.

Identifiers: Area redevelopment, Aggregates (Materials).

Habersham County has minable deposits of asbestos, flagstone, gold, granite gneiss, kyanite, marble, and soapstone, none of which are being mined. Other types of mineral deposits that might be minable include chromite, mica and metal sulphides. Further exploration is recommended for 14 asbestos deposits, three of them new discoveries. The better gold placers are along Soque river and its tributaries, and in two other areas which are new discoveries: (1) Shoal Creek, east of Grassy Mountain, and (2) Beaverdam Creek, 5 miles west of Clarkesville. The commercial kyanite deposits have been delineated. They are in a crescent-shaped area 15 miles long and up to 1-3/4 miles wide, north of Clarkesville. Their quantity and quality are adequate for large scale mining. Weathered sulphide anomalies have been located for which the sources are unknown. Native platinum and the tungsten ore mineral, scheelite, have been discovered. Large tonnages of dolomitic marble suitable for aggregate and agricultural lime can be developed in the northeastern part of the county, possibly at other places along the Brevard belt. Part of the information obtained on the marble has been released and development has already begun. (Author)

PB-170 073 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Kearney (A. T.) and Co., Chicago, Ill.

McDOWELL COUNTY STUDY INVESTIGATION AND PLANNING PHASE REPORT.
Rept. for 4 May-3 Aug 64.
12 Aug 64, 135p
Contract Cc-6142

Descriptors: (*Economics, West Virginia), (*West Virginia, Industries), (*Industries, West Virginia), Natural resources, Employment, Mining engineering, Coal, Population, Commerce, Site selection, Agriculture, Plating, Education, Textile industry, Wood, Metals, Food.

Identifiers: Area redevelopment.

The investigation and Planning Report on Phases I and II is divided into the following sections: I - Introduction; II - Program for Industrial Development; III - Ballard-Warf Company, Inc. - Welch; IV - Frazier Boyd - War; V - West Virginia Wilbert Vault Company - Caretta; VI - Willard Lowman - Welch; VII - New Industries for McDowell County.

PB-170 074 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Jacknin and Co., Inc., Washington, D. C.
ECONOMIC AND ENGINEERING FEASIBILITY STUDY, HICKMAN COUNTY INDUSTRIAL DEVELOPMENT SITES, CENTERVILLE, TENNESSEE. PHASE I. ECONOMIC AND ENGINEERING ASPECTS OF SITE DEVELOPMENT.
Nov 65, 180p
Prepared in cooperation with Dyer (Ben) Associates, Inc., Riverdale, Md.

Descriptors: (*Economics, Tennessee), (*Tennessee, Industries), (*Industries, Tennessee), Population, Feasibility studies, Labor, Site selection, Civil engineering, Rural area, Natural resources, Employment, Transportation, Commerce, Power supplies, Water supplies, Sanitary engineering, Costs.

Identifiers: Area redevelopment.

The report, which constitutes Phase I of the technical assistance project, is directed toward the following: Identification of the principal assets and liabilities of the area from the standpoint of industrial development; establishment of the principal types of industry most likely to find the area attractive as an industrial site; recommendations and a suggested plan of action for further industrial development of the area. Evaluation of potential sites in the area to select the optimum 200 acres of land for future industrial development.

PB-170 075 **Field 5C, 2F, 8F, 11L**
CFSTI Prices: HC$4.00 MF$0.75
Macdonald Associates, Inc., Washington, D. C.
SUPERIOR-DOUGLAS COUNTY WOOD PROCESSING AND MARKETING COMPLEX.
A forest industry feasibility study.
28 Sep 62, 111p
Contract Cc-5897

Descriptors: (*Economy, Wisconsin), (*Industries, Wisconsin), (*Wisconsin, Industries), (*Wood, Industries), Forestry, Commerce, Natural resources, Costs, Labor, Wages, Industrial plants, Transportation, Employment, Charcoal, Processing, Feasibility studies.

Identifiers: Area redevelopment, Furniture.

The report defines in broad terms a wood products manufacturing and marketing complex that could be successfully imposed upon the circumstances of wood raw material, and other influential considerations, found within a resonable operating radius about Superior-Douglas County. Attention is directed to the processing and marketing aspects of such an enterprise, with the knowledge that a permanent wood resource of ever increasing quality is assured from surrounding forests. It is deeply significant that the study area centers on one of the most intensively managed forest regions within the United States. The importance of a proper marketing organization is emphasised. It is in this vital performance area that the lumber industry has often been characteristically weak. This weakness augments the difficulties encountered by a small sawmill operators in the region. Lacking adequate marketing facilities and the strength imparted by exercise of such facilities, existing or future wood industry enterprise will not succeed. On the other hand, by concentration on proper products, sold through a capable and informed marketing organization, there is an excellent opportunity to establish a wood products industry that can contribute significantly to the economic progress of Superior-Douglas County.

PB-170 076 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Hammer and Co. Associates, Washington, D. C.
HOT SPRINGS, N. C. THE FEASIBILITY AND ECONOMIC IMPACT OF NEW RECREATIONAL AND TOURISM FACILITIES.
Oct 62, 175p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, North Carolina), (*North Carolina, Economics), (*Recreation, North Carolina), Employment, Natural resources, Costs, Mountains, Population, Commerce, Feasibility studies.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

The report evaluates the opportunities to develop a complement of recreation facilities and the potential role of recreation development as a means of creating new jobs and income in the area. Section I considers the natural assets and the current economic situation in the area. Sections II and III consider the national demand for recreation and the existing recreational complex that has developed in the Western North Carolina region. Section IV evaluates the potential market available to Hot Springs. Section V presents a recreation plan based on natural assets of the area and an evaluation of demand and market factors. Section VI presents a planned program for recreation development, including cost estimates of specific projects, staging of projects, and expected benefits in terms of new jobs and income generation.

PB-170 077 **Field 5C, 11L, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Hall (Albert G.) and Associates, Washington, D. C.
STUDY REPORT ON FEASIBILITY OF THE ESTAB- LISHMENT OF A CORRUGATING MEDIUM PAPER PLANT IN LOGAN COUNTY, WEST VIRGINIA.
16 May 64, 138p
Contract Cc-6044

Descriptors: (*Economics, West Virginia), (*West Virginia, Economics), (*Paper industry, West Virginia), Feasibility studies, Industrial plants, Paper, Costs, Commerce, Labor, Transportation, Wood, Forestry, Site selection, Containers, Water supplies.

Identifiers: Area redevelopment.

There is ample wood, water, and labor in Logan County, West Virginia, to support a mill producing from 150 to over 300 tons per day of corrugating medium. Markets for the commodity are expanding. There are no real threats from known substitute materials. Our best estimate is that corrugating medium may sell at $100.00 per ton, f.o.b. mill. A 150-ton-per-day mill located at one of several sites in Logan County, West Virginia, and operating 24 hours per day, 300 days each year could probably produce and market corrugating medium at a cost of $86.10 per ton and return to the investors, 2.97 percent on total assets of $10,310,625; or 7.72 percent on equity investment of $3,962,644; or 6.8 percent on sales of $4,500,000. A 300-ton-per-day mill operating 300 days per year could probably produce and market corrugating medium for less than $70.00 per ton, f.o.b. mill. In arriving at the conclusions, a commercial rate of 6 percent per annum for borrowed money was used. If Federal or other financing is obtained at lower than the 6-percent rate, the returns indicated above may be enhanced. Marketing of the product in competition with the output of integrated pulp and paper product plants remains an unsolved problem since it was not possible to obtain either firm commitments or even reliable indications that markets already held by other mills can be served by a new independent entity. (Author)

PB-170 079 **Field 5C, 5K, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Harkenhoff (Gordon) and Associates, Albuquerque, N. Mex.
RECREATION FACILITIES FOR BLUEWATER LAKE.
Engineers preliminary rept.
16 Apr 64, 104p
Contract Cc-6123

Descriptors: (*Economics, New Mexico), (*New Mexico, Economics), (*Recreation, Lakes), Geography, Population, Feasibility studies, Roads, Natural resources.

Identifiers: Area redevelopment, Recreational facilities.

The report presents the results of preliminary investigations and analyses performed to determine the potential demand for recreation facilities at Bluewater Lake together with market analyses and economic studies pertinent to the development. (Author)

PB-170 080 **Field 5C, 6H, 13C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
New Bedford Inst. of Tech., Mass. Research Foundation.
MECHANICALLY UNLOADING FISHING VESSELS IN THE PORT OF NEW BEDFORD, MASSACHUSETTS,
by Conrad P. Richards, J. Louis Roberts, and Alfred Duckworth. 1964, 13p
Contract Cc-5915
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Massachusetts), (*Massachu setts, Seafood), (*Handling, Fishes), (*Seafood, Industries), Piers, Hoists, Conveyors.

Identifiers: Area redevelopment.

Better methods of unloading fish from vessels into plants (located dockside) are presently needed and must be taken into consideration in the proposed South Marine Terminal. The need is imperative not only in terms of increasing efficiency, but also in terms of maximum land utilization at the South Marine Terminal. This paper reports on the design principle and construction of a prototype unit to improve the present method of unloading fish from a vessel to a plant located on the dock. Information is included on the construction of the prototype of this unit and one subsequent test of this unit under limited commercial operation. This paper also considers the merits of another possible unloading principle now in operation at the Point Judith, Rhode Island Co-Op. and comments on its possible application at the proposed South Marine terminal site. (Author)

PB-170 082 **Field 5C, 11L, 8F, 2F**
CFSTI Prices: HC$5.00 MF$1.00
Bovay Engineers, Inc., Spokane, Wash.
FOREST PRODUCTS COMPLEXES FOR PROCESSING TIMBER FROM THE COLVILLE INDIAN RESERVATION AND FERRY COUNTY, WASHINGTON,
by William N. Pauley. Jun 65, 182p
Contract Cc-6172

Descriptors: (*Economics, Washington), (*Washington, Economics), (*Wood, Washington), Forestry, Industries, Industrial plants, Costs, Site selection, Plywood, Laminates, Employment, Charcoal, Natural resources, Commerce.

Identifiers: Area redevelopment, Indian reservations.

The study developed that two main log-using complexes would make best use of the resource; one at Republic and one at Kettle Falls. There are accompanying satellite green sawmills at West Fork and Inchelium whose lumber and chips are trucked to Republic and Kettle Falls. Integrated green veneer plants are at Republic and Kettle Falls. A full plywood plant is the next step. The economy would be improved by new manufacturing facilities. Some sawmills, mostly part-time marginal operators, would be discontinued. Stabilized payrolls, together with services and supply jobs, would enhance either community. The whole area would be most benefited if the development is from the inside, preferably by association with existing perimeter operators. The least desirable situation would occur if third-party interests put in green lumber or veneer operations and shipped the material to distant points for further remanufacture. The Colville Indian Reservation could use its 120,000,000 bd. ft. of annual timber, or a good share of it in a separate large complex to produce lumber, veneer, or plywood in any combination, and double the profits because of the tax-exempt potentials. It would most likely be located at Inchelium. The report is conservative in that the economics were calculated with an inflated log cost over the current market. It also disregards any freight rebates from dry lumber. Roughly, the profitability could be as much as about 40 percent more.

PB-170 083 **Field 5C, 11L, 2F, 8F**
CFSTI Prices: HC$3.00 MF$0.75
McNew (George J.), Fort Worth, Tex.
FEASIBILITY- STUDY; WARREN COUNTY, GEORGIA, PROJECT.
Jan 64, 68p
Contract Cc-6038

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Wood, Industries), (*Industries, Georgia), Feasibility studies, Industries, Forestry, Trees, Natural resources, Transportation, Labor, Fuels, Power supplies, Water supplies, Sewage, Education, Costs, Trailers, Housing.

Identifiers: Area redevelopment, Furniture, Taxes, Wood industry.

The information developed throughout the feasibility study pertains to subjects embraced by the overall economic situation, availability of materials, sales of the prospective company's products, the manufacturing function, and items related to costs and profitable operation. CONCLUSIONS: Warren County, having the physical and geographic situation reported, possesses the possibilities of a progressive and thriving business. Under the appropriate circumstances, there can be and should be a successful furniture operation instituted. (Author)

PB-170 084 **Field 5C, 13J, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Booker (R. W.) and Associates, Inc., St. Louis, Mo.
MARINE PIER AND FACILITIES (KNOX PIER, INC.) ROCKLAND, MAINE.
Final rept.
Oct 65, 49p
Contract C-56-65 (Neg.)

Descriptors: (*Economics, Maine), (*Maine, Economics), (*Piers, Maine), (*Industries, Maine), Commerce, Water traffic, Barges, Industrial plants, Cereals, Handling, Transportation, Shipping (Marine), Costs.

Identifiers: Area redevelopment.

Knox Pier, Inc., should construct a nominal 25,000 ton per year feed mill for K-L Feed Mill, Inc. Its cost of $250,000 should be repaid by amortizing rental payments. Knox Pier, Inc., should construct a barge landing and bulk grain handling facility adjoining the feed mill. Its cost of $243,000 should be repaid by collection of tolls for grain handled. Knox Pier, Inc., should own and operate, using hired tugboat services, a corn carrying barge of 2,500 tons capacity. Its cost of $160,000 should be repaid by collection of freight for grain handled. Knox Pier, Inc., and K-L Feed Mill, Inc., should jointly hire a skilled manager to be responsible for the conduct of the two businesses on a 50-50 shared salary basis. Knox Pier, Inc., should make every effort to persuade the Nova Scotia authorities that Rockland is the correct U. S. terminal for any additional ferry service, keep a close check on the prospect for expansion of its operations, and study ways of improving its operations such as utilization of a joint multi-barge tugboat service which has been proposed for the Atlantic coast. (Author)

PB-170 086 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Nathan (Robert R.), Associates, Inc., Washington, D. C.
MULTI-COUNTY PROGRAMMING AND IMPLEMENTATION FOR ECONOMIC DEVELOPMENT; A DEMONSTRATION IN THE UPPER PENINSULA OF MICHIGAN.
Final rept.
Jul 64, 79p
Contract Cc5955

Descriptors: (*Economics, Michigan), (*Michigan, Economics), Natural resources, Transportation, Management planning, Wood, Forestry, Recreation, Mining engineering, Seafood, Agriculture, Labor, Commerce, Employment.

Identifiers: Area redevelopment.

Contents: (1) The upper peninsula of Michigan and its problems. (2) A demonstration in multicounty development. (3) A model in planning, action and organization: Transportation. (4) Evaluation of the demonstration project. (5) The implication of the demonstration for other areas. (6) Recommended economic goals and development programs for the upper peninsula of Michigan, parts 1 and 2.

PB-170 087 **Field 5C, 8F, 5A**
CFSTI Prices: HC$5.00 MF$1.00
Appalachian Inst. Committee.
REPORT OF THE APPALACHIAN INSTITUTE COMMITTEE TO THE CONFERENCE OF APPALACHIAN GOVERNORS AND THE PRESIDENT'S APPALACHIAN REGIONAL COMMISSION,
by William R. Ewald, Jr. Oct 64, 167p
Contract Cc-6121

Descriptors: (*Symposia, Economics), (*Employment, Geography) (*Industries, Geography) (*Economics, Geography), Education, Sociology, Management engineering, Population, Commerce, Natural resources, Industrial plants, Coal, Wood, Agriculture, Roads, Urban planning, Recreation, Universities, Management planning, West Virginia, Alabama, Georgia, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia.

Identifiers: Appalachian region, Area Redevelopment, Appalachian Institute Committee.

Contents: The situation in appalachia, present organization for development, basic opportunities, building the technical capacity for development, functions of the appalachian institute, organization alternatives for the institute, details of organization, mode of operation.

PB-170 088 **Field 5C, 8F**
CFSTI Prices: HC$6.00 MF$1.50
Technical Planning Associates, Inc., New Haven, Conn.
VACATION - RECREATION - TOURISM IN NORTHERN BERKSHIRE,
by Geoffrey Baker. Nov 63, 297p
Contract Cc-5953

Descriptors: (*Economics, Massachusetts), (*Massachusetts, Economics), (*Recreation, Economics), Employment, Labor, Natural resources, Mountains, Forestry, Culture, Education, Roads, Traffic, Rivers, Water supplies, Climatology.

Identifiers: Area Redevelopment, Tourist industry, Recreational facilities.

CONTENTS: I. What inherent advantages does Northern Berkshire have for recreation-vacation-tourism. II. How does Northern Berkshire rank in comparison with other areas competing for tourist dollars. III. What does the tourist find when he reaches Northern Berkshire. IV. Mount Greylock dominates Northern Berkshire physically and psychologically. V. Skiing facilities will bring tourists during the winter season when accommodations now lie empty and closed. VI. The Eastern Plateau can be made a demonstration project, a region reclaimed for both year-round and tourist use. VII. A network of Scenic Highways can open the whole of Northern Berkshire to tourists. VIII. What other special resources does Northern Berkshire possess. How can their tourist potential be developed. A. The Arts, Theater, Science, Education. B. Outdoor Sports and Recreation. C. New Land Uses. IX. Accommodations, present and proposed. X. Publicity and Promotion. XI. The Massachusetts Department of Natural Resources. XII. Legislation required. XIII. Employment. XIV. Financing.

PB-170 090 **Field 5C, 21D, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Underground Storage and Exploration, Inc., Bala-Cynwyd, Pa.
UNDERGROUND STORAGE TERMINAL FOR LIQUID PETROLEUM GAS (LPG) JIM THORPE, CARBON COUNTY, PA.
1965, 57p
Contract Cc-5943
See also PB-170 058.

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Economics), (*Storage tanks, Underground structures), (*Petroleum industry, Pennsylvania), Liquefied gases, Storage, Petroleum, Costs, Feability studies, Commerce, Site selection, Employment, Roads, Transportation.

Identifiers: Area redevelopment.

Economic feasibility studies for a minimum initial start storage of 500,000 barrels capacity, estimated total cost $2,100,000., and a more realistic starting capacity of 1,000,000 barrels, estimated total cost $3,200,000., indicate that with both federal and state participation in financing a storage user cost of 63 cents per 42 gallon barrel per year, plus handling charge is obtainable. According to market economics, as discussed with LP-Gas producers and distributors, this is the border line service cost above which storage would not be of interest. Operation of a 500,000 barrel minimum storage capacity terminal would require the above storage charges and would be of interest to private investors, though affording a minimum return on investment, if the users of storage were willing to enter into contracts of fifteen or more years duration. Operation of a 1,000,000 barrel storage terminal, a more realistic capacity based on verbal indication from interested companies, has been studied at the same rate for service and predicated on fifteen year leasing contracts shows a very fair

return on private investment. In fact, it would be possible to reduce the storage charge to 42 cents per barrel per year and have a fair return and project pay-out period. (Author)

PB-170 093 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Denver Research Inst., Colo. Industrial Economics Div.
ANALYSIS OF THE SISSETON RESERVATION AS A LOCATION FOR AN ELECTRONICS ASSEMBLY OPERATION, PHASE III.
Jul 65, 42p
Contract 14-20-0650-1378
Availability: Original document in color until exhausted.

Descriptors: (*Economics, South Dakota), (*South Dakota, Economics), (*Industries, South Dakota), Assembling, Electronic equipment, Labor, Employment, Costs, Employee relations, Supervisory personnel, Electrical equipment, Site selection, Industrial plants.

Identifiers: Area redevelopment, Indians, Indian reservations.

The purpose of the report is to furnish prospective firms with preliminary information to assist in deciding whether it would be worthwhile to investigate the opportunities of locating an operation on the reservation. The analysis indicates that certain labor-intensive electronic, electrical equipment, and industry assembly operations can be profitably established there (PB-170 131). Significant advantages at the Sisseton Reservation include an available pool of trainable labor and the presence of cost reducing factors. The main deterents to the establishment of an electronics assembly operation there are the relatively remote location and the unavailability of supervisory talent.

PB-170 094 **Field 5C, 5K, 5J, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Denver Research Inst., Colo. Industrial Economics Div.
A SOCIO-PSYCHOLOGICAL STUDY OF THE INDIANS ON THE SISSETON RESERVATION, SOUTH DAKOTA. PHASE I,
by Carl von E. Bickert. Jul 65, 179p
Contract 14-20-0650-1378
See also PB-170 093 and -170 131.

Descriptors: (*Economics, South Dakota), (*South Dakota, Economics), (*Sociology, South Dakota), Psychology, Population, Employment, Diseases, Aptitude tests, Personality, Sociometrics, Labor, Education, Housing, Recreation.

Identifiers: Indians, Indian reservations, Area redevelopment.

The purpose is to present a socio-economic description of the Lake Traverse Reservation (commonly referred to as the Sisseton Reservation), to identify the existing social problems of the Indians on the Reservation, and wherever possible to indicate appropriate corrective measures. The major problems facing the Indians are: (1) The failure to acculturate to the demands of the twentieth century, industrialized American society. (2) The population growth of the Indians on the Reservation. (3) An extremely high unemployment and underemployment rate among the Indians. (4) A less than ideal relationship between the Indians and non-Indians on the Reservation. Four major recommendations are offered to help alleviate the problems. (1) To narrow the gap between the Indian Reservation environment and the majority of American society. (2) To initiate an educational program in family planning, and for those who desire it, an educational program in birth control procedures. (3) To provide employment opportunities for Indians on the Reservation which will take advantage of the potential skills among the Indians. (4) To involve members of both the Indian and non-Indian communities in the planning, initiation and implementation of the above-mentioned programs.

PB-170 095 **Field 5C, 13B, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Clark, Daily, Dietz and Associates, Urbana, Ill.
FEASIBILITY REPORT ON POTABLE WATER SUPPLY FOR CARLYLE RESERVOIR AREAS.
Dec 62, 93p
Contract CC-5941

Descriptors: (*Water supplies, Illinois), (*Economics, Illinois), (*Illinois, Water supplies), Feasibility studies, Population, Dams, Recreation, Civil engineering, Rural areas, Employment, Costs, Recreation.

Identifiers: Area redevelopment, Reservoirs, Recreational facilities.

The report presents an evaluation of the Engineering and financial feasibility of extending the Carlyle, Illinois municipal water system as a means of supplying potable water to an area contiguous to the Carlyle Reservoir. It is designated as a multipurpose reservoir to provide for flood control, recreation, municipal and industrial water supply, conservation and related items. This reservoir is planned for a permanent pool surface area of 26,000 acres after 1968. In order to properly utilize the recreational features of the reservoir, the Corps of Engineers and the State of Illinois Department of Conservation have planned recreational and conservation facilities to be located adjacent to the reservoir. Construction of these facilities is planned to commence in 1963 with construction phased to meet anticipated public use requirements. The initial recreation facilities planned by these agencies are strategically located at ten sites along the shoreline of the reservoir. The public use facilities will include picnic grounds, camping grounds, marinas, food concessions and overnight accomodations. A potable water supply is a basic necessity for development of these areas.

PB-170 096 **Field 5C, 8F, 1E**
CFSTI Prices: HC$6.00 MF$1.25
Bowman (Irving) and Associates, Charleston, W. Va.
EMPLOYMENT OPPORTUNITIES AS RELATED TO KANAWHA AIRPORT EXPANSION AND INDUSTRIAL PARK DEVELOPMENT,
by William J. Friedman, III. Jan 63, 227p

Descriptors: (*Economics, West Virginia), (*Airports, West Virginia), (*Industries, West Virginia), (*West Virginia, Economics), Employment, Site selection, Industrial plants, Labor, Population, Air transportation, Aircraft, Roads, Commerce, Jet planes, Electronics, Electrical equipment.

Identifiers: Area redevelopment, Industrial parks.

Engineering analysis as presented in Section IX clearly shows that modern aircraft will not be able to operate from the present facilities at Kanawha Airport. If these facilities are not up-dated there will be contraction of those existing industries dependent on good aviation oriented new industry. If the proposed project is successful, it will create a unique jet airport not found anywhere else in the United States in that it will be located within eight minutes of the downtown business district and there will be no jet aircraft noise over the city whatsoever. It is recommended that Federal funds be nade available to Kanawha County, for the purpose of expanding and modernizing its airport facilities and creating thereby, a prepared industrial site for occupancy by one or more new industries not located in the area at the present time. The new site, because of its proximity to the airport, would offer special advantages to aviation oriented manufacturers of electrical machinery or electronic components.

PB-170 097 **Field 5C, 11L, 2F, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Interior, Washington, D. C. Resources Program Staff.
HOMEBUILDING AS A MARKET FOR PRODUCTS OF EASTERN FORESTS.
ARA technical assistance leaflet no. 3,
by G. J. Stout. 1962, 12p

Descriptors: (*Economics, Wood), (*Industries, Wood), (*Wood, Industries), (*Housing, Wood), Natural resources, Commerce, Prefabricated buildings, Quality control, Floors, Distribution (Economics), Forestry.

Identifiers: Area redevelopment.

Market quality of locally produced lumber should be improved. As now sawed and handled by the small 'whip-poor-will' sawmills, it simply cannot compete with shipped-in lumber due to poor grading, rough or unsuitable finish and unstandardized character. In order to produce a quality product it probably will be necessary for harvesting enterprises to be organized on a cooperative basis. A larger scale of operations would make it possible to procure necessary facilities and equipment. A few pilot operations of this kind have shown that this idea is a sound one and that enlarging the scale of operations also makes it possible to dispose of other forest products and by-products with profit. The use of products of eastern forests should be made more attractive to builders in the locality. More can be accomplished by working with and through local lumber dealers than by setting up separate business of manufacturing organizations to compete with them. Hardwood flooring should be promoted for use in on-grade construction. The lumber industry should be alert and open-minded to new uses for wood and new applications for old materials in homebuilding.

PB-170 099 **Field 5C, 13H, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A PROGRAM OF RESEARCH AND TECHNICAL ASSISTANCE FOR THE GRANITE INDUSTRY IN ELBERT COUNTY, GEORGIA.
Final rept.,
by Jerry L. Lewis and Joe N. Harris. May 65, 133p A-702
Contract Cc-6033.

Descriptors: (*Georgia, Economics), (*Economics, Georgia), (*Granite, Industries), Processing, Standards, Cutting, Aging (Materials), Physical properties, Natural resources, Commerce, Distribution (Economics).

Identifiers: Area redevelopment.

Contents: structure of the granite monument industry, growth potential of the granite monument industry, quality standards in the Elbert county granite industry, product standardization in the Elbert county granite industry, an evaluation of the Elbert county granite industry, properties of Elbert county granite, weathering studies of Elbert county granite, investigation of waste product, evaluation of cutting techniques, utilization of bulk granite.

PB-170 100 **Field 5C, 6H, 8F, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
CUSTOM FABRICATION OF STAINLESS STEEL FOOD SERVICE EQUIPMENT. A MANUFACTURING POSSIBILITY IN CARROLL COUNTY, GEORGIA,
by William C. Eisenhauer. May 64, 22p
Technical rept. TR-8, A-619
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Kitchen equipment + supplies, Stainless steel), (*Georgia, Economics), (*Economics, Georgia), Production, Costs, Commerce, Feasibility studies, Material form-

ing, Labor, Transportation, Manufacturing methods, Industrial plants.

Identifiers: Area redevelopment.

A plant for custom fabricating stainless steel food service equipment in Carroll County should net $19,100 (including interest paid) on sales of $300,000. Return on the recommended total capital investment of $140,000 would be about 13%. The plant could combine the advantage of access to the growing southeastern market with an attractive labor situation. Food service equipment is used by restaurants, cafeterias, hotels, hospitals, and similar operations in both private and public buildings. Sold by the bid system commonly used in the building industry, food service equipment may be made from a variety of materials and in a variety of qualities, but custom fabricators may specialize in equipment with stainless steel surfaces. Custom fabrication of stainless steel food service equipment follows the long-term and seasonal cycles of the construction industry in general. It is highly competitive, and its products are fabricated by a large number of small companies. Operations required to produce custom-fabricated food service equipment are (1) drafting of shop drawings, (2) layout, (3) cutting, (4) forming, (5) joining, and (6) finishing. A plant capable of producing about $300,000 worth of custom-fabricated stainless steel food service equipment would require a maximum capital investment of $220,000, a minimum of about $125,000. The variation depends largely on whether the required 15,000-square-foot building is purchased, rented, or leased.

PB-170 101 **Field 5C, 13H, 8F, 11I**
CFSTI Prices: HC$2.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
INJECTION MOLDING OF PLASTICS PRODUCTS. A MANUFACTURING POSSIBILITY IN CARROLL COUNTY, GEORGIA,
by William C. Eisenhauer. May 64, 26p
Technical rept. TR-9, A-619
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Georgia), (*Georgia, Plastic industry), (*Plastics, Molding), Commerce, Labor, Manufacturing methods, Industrial plants, Transportation, Costs, Distribution (Economics).

Identifiers: Area redevelopment.

A plant for proprietary and custom injection molding of consumer and industrial plastics products in Carroll County should net $23,800 (including interest paid) on sales of $300,000. Over-all return on a total capital investment of $150,000 would exceed 15%. An injection-molding operation can be set up with relative ease. Capital requirements can total about $110,000, generous technical assistance is available from manufacturers and suppliers of raw materials, and most operating skills can be quickly and easily learned. The operations required to produce plastics products by injection molding include (1) preparation of the molding material, (2) melting the material, (3) forcing the material through a nozzle and into a mold, (4) ejecting the molded part, and (5) machining and finishing the product. From its position in the center of a large and growing seven-state market, Carroll County can offer the injection-molding industry access to well developed distribution and transportation facilities for shipping plastics products. Among these is oneor two-day delivery on less-than-truckload shipments to a large part of the area. The county can also offer an attractive labor supply. Farm labor and textile workers probably can be quickly retrained for the unskilled or semi-skilled jobs which prevail in plastics work. The county's labor relations record is another asset.

PB-170 103 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Rosenstock-Holland-Associates, Akron, Ohio.
FEASIBILITY SURVEY (TECHNICAL AND ECONOMIC) OF PROPOSED RECREATIONAL MARINA ASHTABULA, OHIO,
by Matthew J. Rosenstock. 2 Jul 65, 142p
Contract C-159-65
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Ohio), (*Ohio, Economics), (*Recreation, Economics), Feasibility studies, Pennsyl vania, Costs, Piers, Boats, Employment, Commerce, Lakes.

Identifiers: Area redevelopment, Marina, Recreational facilities.

The economic level of Ashtabula County, Ohio, has not maintained pace with the growth of the state or nation. The major cities of Ashtabula and Conneaut are geographically located to offer excellent recreational possibilities. The objectives of this study have been: (a) To conduct an in depth study of the market potential in Northeastern Ohio and Pennsylvania for water oriented recreational facilities. (b) Based upon these findings, to develop preliminary plans that accomplish the desired results. (c) Effect an economic study of costs, revenue, and methods of financing. (d) Determine a measure of benefits, both direct and indirect, to be derived. Pleasure boating recreation is the basis for all of the facilities contemplated. Permanent dockage desire and physical space provide the yardstick for the determination of the size of development and extent and character of supporting facilities, even though only about 20% of the pleasure boating public using these developments require permanent dockage. The market study reveals, upon close examination of the results by established methodology, that: (a) In the year 1965, there is an indicated demand for 2125 permanent berths, and projected to 1967, it will be 15% greater or 2,444. (b) There are 298 berths available at present and much of this space is not considered desirable for many reasons. None of the existing spaces are considered modern in character by comparison with similar developments in the State and Nation.

PB-170 104 **Field 5C, 8F, 6H, 11G**
CFSTI Prices: HC$5.00 MF$1.00
Little (Arthur D.), Inc., Cambridge, Mass.
FEASIBILITY OF A COMMERCIAL SEA LION OPERATION IN ALASKA.
May 64, 153p C-64869

Descriptors: (*Economics, Alaska), (*Alaska, Seals (Zoology)), (*Seals (Zoology), Commerce), (*Food, Industries), Feasibility studies, Meat, Fur, Costs, Employment, Natural resources, Industries, Transportation, Processing, Labor, Seafood.

Identifiers: Area redevelopment, Sea lions.

A study was made to analyze the feasibility of a commercial sea lion operation in Alaska. A commercial sea lion operation appears to be technically feasible. The potential yield of sea lion meat, pupskins, and blubber seems adequate to support a small land-based processing operation at a number of locations. Successful harvesting techniques have been developed to overcome the problem posed by a short breeding season. Processing requirements for the meat are relatively simple and can be met through the use of techniques adapted from cattle slaughtering. High-level Aleut leadership for over-all business management will be difficult to obtain, but there appears to be adequate manpower to meet the labor requirements of a sea lion operation. Skills not now available can be developed on the job. Carriers that now serve the area have adequate capacity, and a major investment in transportation equipment is not warranted for the expected level of output.

PB-170 105 **Field 5C, 5K, 8F**
CFSTI Prices: HC$4.00 MF$0.75
EBS Management Consultants, Inc., New York.
FEASIBILITY STUDY FOR PROPOSED OZARK CENTER AT MOUNTAIN VIEW, ARKANSAS, AND ATTENDANCE POTENTIALS FOR CERTAIN PROJECTS IN ADJACENT REDEVELOPMENT AREAS FOR AREA REDEVELOPMENT ADMINISTRATION, WASHINGTON, D. C.
1 Mar 65, 109p
Contract Cc-6164

Descriptors: (*Economics, Arkansas), (*Arkansas, Economics), (*Recreation, Economics), Commerce, Employment, Costs, Population, Feasibility studies, Labor.

Identifiers: Area redevelopment, Tourist industry.

The proposed Ozark Center project is the only course of action which, together with other potential projects, will (a) stimulate the local economy and (b) create new job opportunities. The proposed Ozark Center project would provide a focal point for a particular type of authentic rural folk music and folk dancing which are the only wholly American cultures except for jazz. It is feasible to assume that the proposed Ozark Center project can be operated on a limited basis and that revenues will be sufficient to offset expenses provided that an experienced lessee is permitted to direct the promotional activities and the staging of events. It is likewise feasible to assume that an expanded Ozark Center project - one that incorporates many added features which appeal to the type of tourism existing in the general area - can be operated on the basis that the increased revenues will be sufficient to offset the increased costs and still provide the lessee an opportunity to earn a limited profit. In this instance, however, a particularly qualified lessee - able to provide needed working capital of about $250,000 - will have to be sought.

PB-170 106 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Checci and Co., Washington, D. C.
THE POTENTIAL POWER OF TOURISM - MESCALERO RESERVATION (NEW MEXICO).
Jan 63, 64p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. and the Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, New Mexico), (*New Mexico, Economics), (*Recreation, Economics), Costs, Employment, Lakes, Natural resources, Mountains, Roads, Commerce.

Identifiers: Area redevelopment, Tourist industry, Indian reservations, Indians.

The report attempts to explain how and to what extent tourism could assist the Apache Tribe of the Mescalero Reservation in creating jobs and in generating income. There are four main assets favoring the development of tourism on the Reservation: elevation and climate, a chance to create water impoundments, plenty for tourists to do within driving range of the Reservation, and an adequate market. On the negative side, there now is little for the tourist to do on the Reservation itself. The Tribe would be starting from scratch in developing tourist facilities, and it lacks skills and experience in the tourism field. Nevertheless, there is a lucrative tourism market that the Reservation could tap. More than a million individuals live within driving range of the Reservation, who have a high enough income to spend $20 a day or more, provided that facilities are developed that will appeal to this market. What is needed is a first-class resort of approximately 125 rooms located on a lake, preferably in Ciengita Canyon, an attractive area, close to summer and winter tourist facilities just off the Reservation. Further engineering analysis is needed to check technical problems that may be involved in developing a lake in this area.

PB-170 108 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Virginia Polytechnic Inst., Blacksburg. Dept. of Business Administration.

ECONOMIC STUDY OF BUCKINGHAM, CUMBERLAND AND FLUVANNA COUNTIES, VIRGINIA.
Final rept.,
by Martin C. Schnitzer. 1966, 63p
Contract CC-408

Descriptors: (*Economics, Virginia), (*Virginia, Economics), Employment, Industries, Site selection, Natural resources, Labor, Recreation, Population, Transportation, Mining engineering, Agriculture, Forestry, Water supplies.

Identifiers: Area redevelopment.

It can be said that the type of company that would move into this area must possess at least one of the following location characteristics. It processes a raw material that is highly perishable, bulky and easily reduced to a higher value per unit of product weight. It must locate close to the extraction source of the raw material it uses. It requires a large amount of acreage for storage purposes or where objectionable wastes are created as by products of the production process. It has a low per worker capital investment and utilizes a lower-cost, relatively unskilled labor force. The employment per plant is typically small - several hundred workers or less.

PB-170 109 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Georgia Center for Continuing Education, Athens.
FEASIBILITY STUDY, TRAINING AND DEMONSTRA-TION CENTER, GEORGIA TOURIST INDUSTRY.
Final rept.
1966, 139p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Georgia), (*Georgia, Economics), (*Recreation, Georgia), Industries, Feasibility studies, Training, Employment, Natural resources, Commerce, Mountains, History, Costs, Labor.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

The study resulted in a favorable recommendation for the establishment of a Georgia Outdoor Recreation Experiment Station in White County. The station will be dedicated to serving the tourist-recreation industry of the Appalachian region. It will deal directly with four publics: the consumer, or those persons who are seeking merely to enjoy themselves; the producer, or those persons who provide recreation services or manufacture recreation goods; the professional worker, or those persons now involved or wishing to become involved in public or private recreation operations; and the private landowner, or those persons or corporations who wish to make their land productive through providing some means of outdoor recreation to the public. In order to serve those publics it will be necessary to establish an extensive outdoor recreation plant and a sizeable staff to operate it. (Author)

PB-170 110 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Booker (R. W.) and Associates, Inc.
PRESENTATION OF RESULTS INDUSTRIAL SITE SURVEY CUMBERLAND PLATEU, KENTUCKY. PHASE III REPORT. VOLUME I. DISCUSSION AND SUPPORTING DATA,
by Lee Carter. 31 Mar 65, 91p
Contract Cc-6157

Descriptors: (*Economics, Kentucky), (*Kentucky, Industries), (*Site selection, Kentucky), Catalogs, Industrial plants, Geography, Terrain, Data, Maps, Natural resources, Power supplies, Transportation, Roads, Water supplies, Sewage.

Identifiers: Area redevelopment, Cumberland plateau.

The Area Redevelopment Administration, U. S. Department of Commerce has engaged R. W. Booker and Associates, Inc. to identify, classify and select a group of potential industrial sites in the fourteen eastern Kentucky counties of Bell, Floyd, Harlan, Johnson, Knott, Knox, Lawrence, Leslie, Letcher, Magoffin, Martin, Perry, Pike and Whitley. This work has been performed in three phases as follows: I. Exploration and Preliminary Classification II. Selection and Detailed Examination III. Presentation of Results. This report is a final overall report on the entire project and, as such, concerns itself with all aspects of the work whether previously reported or reported here for the first time.

PB-170 112 **Field 5C, 8H, 13B, 8F**
CFSTI Prices: HC$7.25 MF$1.75
Army Engineer District, Huntington, W. Va.
SURVEY REPORT ON GUYANDOT RIVER AND TRIBUTARIES, WEST VIRGINIA, FOR FLOOD CONTROL AND ALLIED PURPOSES. APPENDIXES.
Feb 62, 398p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*Rivers, West Virginia), (*West Virginia, Hydrology), (*Water supplies, West Virginia), (*Floods, Control), (*Hydrology, West Virginia), Natural resources, Damage, Control systems, Dams, Climatology, Data, Tables, Graphics, Fishes, Animals, Reports, Recreation, Water pollution.

Identifiers: Area redevelopment.

Contents- (1) Appendix I - Hydrology: (a) climatology; (b) runoff and steam flow data; (c) storms and floods of record; (d) flood probabilities and frequency; (e) standard project storms and floods (f) design storms and floods (g) spillway design storms and floods; (h) unit hydrograph computations; (i) reservoir regulation. (2) Appendix II - Project Formulation: (a) flood problems; (b) improvements considered. (3) Appendix III - Project Benefits: (a) flood control benefits; (b) water supply benefits; (c) pollution abatement benefits; (d) fish and wildlife recreation benefits. (4) Appendix IV - U.S. Public Health Service Report on Water Supply and Pollution Abatement. (5) Appendix V - U.S. Fish and Wildlife Report.

PB-170 113 **Field 5C, 8I, 8F**
CFSTI Prices: HC$6.00 MF$1.50
Adirondack Development Corp., Willsboro, N. Y.
WOLLASTONITE WET MAGNETIC BENEFICIATION, WET GRINDING, WET CLASSIFICATION, AND INDICA- TIONS OF NEW PRODUCTS.
15 May 64, 235p
Contract Cc-5970,
Proj. 300

Descriptors: (*Economics, New York), (*New York, Minerals), (*Calcium compounds, Silicates), (*Mining engineering, New York), Processing, Labor, Employment, Grinding, Garnet, Costs, Magnetism, Magnetic properties.

Identifiers: Area redevelopment, Calcium.

A pilot plant process for the wet beneficiation of wollastonite ore located in Essex County, New York has been installed and operated for several months, initiating a total ore burden of approximately 300 tons. The heart of this new process is a wet magnetic separator operated successfully for over 1500 hours. The separator handles unsized ore in slurry form whose particle feed mixture may range from 50 to -400 mesh. Beneficiation of the crude mineral by this device gives a product having a wollastonite purity of 99.8% on a single pass. Product yields are equal to that obtained with dry magnetic separations which use closely sized dry ore and multiple passes, but only produce wollastonite of about 98% purity. The cost of wollastonite beneficiated in this manner is shown to be equal to or lower than when dry processed. Product made from the process which consists of magnetic beneficiation, grinding, and classification all on a wet basis has unique and useful surface properties. In addition, 110 to 115 new jobs in an economically depressed area of the United States will be created.

PB-170 114 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Maryland Dept. of Economic Development, Annapolis.
COMMUNITY ECONOMIC INVENTORY: GARRETT COUNTY, MARYLAND.
May 62, 78p
Prepared in cooperation with Garrett County Development Corp., Garrett County Commissioners and Mt. Top Chamber of Commerce.

Descriptors: (*Economics, Maryland), (*Maryland, Economics), Industries, Labor, Transportation, Natural resources, Population, Climatology, Employment, Communication systems, Fuels, Water supplies, Power supplies.

Identifiers: Area redevelopment, Taxes.

SUMMARY DATA: Maryland's largest land area county, 662 square miles; 1960 population, 20,420 (Garrett County); Available labor force, 7,500 (estimated for Garrett plus parts of West Virginia); The most western county in the State. U. S. Route 40 crosses northern edge of county east and west. U. S. Route 50 crosses southern edge of county. U. S. Route 219 crosses both of the above in north-south direction; Served by the B and O Railroad, the Western Maryland Railway, eight truck lines and two inter-city bus lines; Mean high (17 yr. av.) temperature, 59.1 and Mean low (17 yr. av.) temperature, 36.0; Oakland, county seat; Area Redevelopment Administration-designated area. (Author)

PB-170 115 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Maryland Dept. of Economic Development, Annapolis.
COMMUNITY ECONOMIC INVENTORY, CUMBERLAND, MARYLAND.
Jun 62, 74p
Prepared in cooperation with Upper Potomac Industrial Development Company and Cumberland Chamber of Commerce.

Descriptors: (*Economics, Maryland) (*Maryland, Economics), Population, Industries, Labor, Employment, Transportation, Communication systems, Fuels, Natural resources, Recreation, Power supplies.

Identifiers: Taxes, Area redevelopment, Recreation facilities.

Cumberland, Maryland: Maryland's third largest city covering eight square miles, 641 feet above sea level. 1960 population: city, 33,415; county, 84,169. Available labor force: 5,000 (estimate). Midway between Baltimore and Pittsburgh in the foothills of the Allegheny Mountains of western Maryland. Served by 3 railroads and 35 truck lines. Mean high temperature, 64 degrees; mean low temperature, 52.1 degrees. County seat of Allegany County.

PB-170 117 **Field 5C, 8I, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Bayles (Allison L.) and Associates, Pitsburgh, Pa.
FEASIBILITY STUDY AND SUPPLEMENT, DEMON- STRATION MINE USING LONGWALL

MINING TECH- NIQUES, WINDBER, SOMERSET COUNTY, PENNSYLVANIA.
1965, 155p
Contract Cc-6114

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Mining engineering), (*Mining engineering, Feasibility studies), Costs, Coal, Industrial equipment, Industries.

Identifiers: Area redevelopment.

The Central Pennsylvania coal reserves are adaptable largely to longwall mining techniques using powered roof supports and full caving. The C' (C prime) seam has the largest reserves of the various seams in Somerset County. The site chosen for the Demonstration Mine in the C' seam has mining conditions adapted to the longwall system of mining. The C' coal can be mined by longwall mining technique, cleaned and loaded in half-trainload lots as a 13,600 B.t.u. (as received) product and be profitable with a realization of $4.10 per ton. Longwall mining equipment can be made available to operators on a leasing basis. A well-known industrial banking organization has examined the nature of the demonstration mine installation and has expressed interest in leasing the equipment to an acceptable operator on the basis of a feasibility study such as this paper. Since longwall mining installations require a relatively high capital expenditure, leasing would place the necessary equipment within the reach of operators who might otherwise be deprived of the opportunity.

PB-170 118 **Field 5C, 13B, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Spindletop Research Center, Lexington, Ky.
LAKE BARKLEY REGIONAL PLAN,
by David P. Fogle. Mar 65, 106p T-113

Descriptors: (*Economics, Kentucky), (*Kentucky, Economics), Lakes, Dams, Commerce, Terrain, Site selection, Industries, Recreation, Population, Rural areas, Management planning, Natural resources.

Identifiers: Area redevelopment.

The Lake Barkley Regional Plan includes (a) land use recommendations for the unincorporated portions of Lyon and Trigg Counties affected by the Lake, (b) seperate recommendations for revisions to the Cadiz General Plan, (c) recommendations for coordination of Eddyville and Kuttawa city plans, and (d) land use recommendations for Grand Rivers in Livingston County.

PB-170 119 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Horwath and Horwath, Dallas, Tex.
FRONTIER WEST, INCORPORATED. DRAFT REPORT.
15 Oct 64, 161p
Contract C-10-65

Descriptors: (*Economics, Arizona), (*Arizona, Economics), (*Recreation, Economics), (*New Mexico, Economics), (*Colorado, Economics), Commerce, Feasibility studies, History, Costs, Roads, Traffic, Natural resources.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

A feasibility study was made of the proposal of Frontier West, Inc., a Delaware corporation with a Denver, Colorado, address, for an 'integrated tourism project based on historical heritage with educational significance intended to inspire international interest and national civic pride in the national parks and monuments'. From a business viewpoint, there was practically no data submitted to support either a demand for such facilities or the definition of the potential market. Of the five locations, those near Taos and Durango are not on Interstate Highways. The Montezuma Castle (between Phoenix and Flagstaff, Arizona) site is on Interstate 17 which is actually more of an intercity highway. The Flagstaff, Durango and Taos locations are subject to seasonal fluctuations and the latter two, in addition, experience extreme weather variations. The locations on U.S. 66 (Interstate 40) 17 miles east of Albuquerque and 32 miles west of Gallup (later changed to Houck, Arizona) both have high-volume traffic and no immediate competition. The planning of facilities is well-designed to meet the Frontier West program. The bunkhouse rooms should have little appeal for business men or overnight travelers, as a room without bath is practically unheard of in the industry. In all locations summer demand is very high. On a year-round basis, however, there is no shortage of accommodations in any of the areas. Since little or no effort is needed for summer business, practically all promotion will be directed to the off-season. Unless new business can be brought in by such a program, the Frontier West Centers will be competing directly with existing properties for a redistribution of existing business.

PB-170 120 **Field 5C, 8I, 8F, 8G**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Univ., Athens.
THE BELL MOUNTAIN SILICA DEPOSIT, TOWNE COUNTY, GEORGIA. PART I. GEOLOGIC STUDY OF THE BELL MOUNTAIN SILICA DEPOSIT, TOWNS COUNTY, GEORGIA; DEVELOPMENT OF A COLOR -SORTER FOR CRUSHED STONE. PART II. SURVEY OF THE MARKET FOR THE BELL MOUNTAIN SILICA.
Final rept.,
by Vernon J. Hurst, and George R. Horton. 1964, 89p
Contract Cc-6094

Descriptors: (*Economics, Georgia), (*Georgia, Minerals), (*Silicon compounds, Dioxides), Quartz, Pyrites, Costs, Colors, Rock (Geology), Phototubes, Iron compounds, Oxides, Economic geology, Mining engineering, Commerce, Natural resources.

Identifiers: Area redevelopment, Silicon dioxide.

Mapping and core drilling at Bell Mountain have proven 2 million tons of silica. The silica is varicolored: white, yellow, pink, yellow-brown, red-brown. Coloration is due mainly to iron oxide released during the decomposition of pyrite finely scattered through the silica. The pyrite is mostly decomposed in the upper 50-75 feet of the mass, and partly decomposed down to depths of 250 feet. Though the stone is generally a litle whiter at depth, it is still mostly varicolored. The production of a uniform or high quality silica product requires that the crushed stone be sorted. A device to sort the stone on the basis of color has been developed. Though the silica deposit at Bell Mountain is being exploited on a limited scale, the expansion of the market is unlikely at current prices (about $35.00/ton). Though there are possibilities for market expansion, a large market does not now exist for the Bell Mountain silica at current prices.

PB-170 121 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Checchi and Co., Washington, D. C.
A PRE-FEASIBILITY STUDY OF SMALL-BOAT HAR- BOR PROJECTS FOR THE CITY OF GRAFTON, JERSEY COUNTY, ILLINOIS.
Dec 64, 56p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Illinois), (*Illinois, Econ omics), (*Harbors, Boats), Rivers, Commerce, Costs, Recreation, Site selection.

Identifiers: Area redevelopment, Mississippi river, Marina.

Grafton has locational advantages which would favor the long-range outlook for a marina operation. There is an impressive accumulation of firm information indicating that the demand for first-class boating facilities would justify a relatively large harbor and service complex (marina) at Grafton. Such a marina at Grafton would bring many direct and indirect benefits to the community. In order to pay off, a small-boat harbor at Grafton would have to generate revenues from a range of services normally carried by successful marina. It would also require professional development and management from the outset. Since the City of Grafton is hoping to undertake a major investment project with very limited financial resources, it must rely heavily on outside assistance. This could come from private, State, and Federal sources. Any of the projects analyzed in this report would be financially feasible if certain basic fixed capital cost items could be financed by grants-in-aid. However, only the smaller project would have a chance to pay off if no grants were available. (Author)

PB-170 122 **Field 5C, 13H, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Mead Carney International Co., New York.
FEASIBILITY STUDY ALUMINUM EXTRUSION PLANT FOR KASSON AND KELLER, INC. FONDA, NEW YORK.
19 Nov 64, 82p

Descriptors: (*Economics, New York), (*New York, Industries), (*Aluminum, Extrusion), (*Industrial plants, New York), Costs, Feasibility studies, Commerce, Power supplies, Water supplies, Roads, Sewage, Industrial equipment, Manufacturing methods, Employment, Transportation, Labor.

Identifiers: Area redevelopment.

An investigation was completed to determine the economic feasibility of building a new plant, manufacturing, and selling about 6,000,000 pounds of extruded aluminum shapes annually. At least 1,500,000 pounds of this would be captive in that it would be used by Kasson and Keller, Inc. for the fabrication of aluminum storm windows and storm doors. The market potential for the proposed products is excellent. The extrusion industry is on the threshold of a steady growth phase. From all practical aspects, a reasonable profit can be expected over an indefinite period of time. From a competitive viewpoint, the proposed business venture would be in a favorable position. Geographically, there are no competitors having plants within a radius of 175 miles. Very few competitors offer a complete service including mill finish, anodized and painted extrusions which this facility would produce. Many extrusion customers have need for all three types of finish and prefer a supplier who can offer a complete line. (Author)

PB-170 124 **Field 5C, 2B, 6H, 11L K**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
EVALUATION OF AGRICULTURALLY ORIENTED AND WOOD-BASED MANUFACTURING OPPORTUNITIES IN CARROLL COUNTY, GEOGIA.,
by Martha Ann Deadmore, Tze I. Chiang, andOliver Terriberry. Feb 64, 20p Technical rept. no. TR-7
Proj. A-619

Descriptors: (*Economics, Georgia), (*Georgia, Economics), (*Agriculture, Georgia), (*Wood, Georgia), Commerce, Labor, Industries, Employment, Meat, Pallets, Fiberboard, Food, Processing, Trees, Forestry, Bovines.

Identifiers: Area redevelopment, Feed.

Establishment of a commercial feed lot offers the greatest potential for developing the agricultural economy of Carroll County. Not only would it stimulate an increase in the quantity and improvement in the quality of cattle produced, it would also indirectly encourage expansion of local meat processing plants and feed and grain mills. In the wood-based industry field, plans should be made to utilize the low-grade and small-diameter timber

(particularly hardwood) which predominates in the area around Carrollton. Perhaps the best and most immediate opportunity for new wood-based industry in Carroll County lies in the manufacture of wooden pallets in conjunction with other wood products which also use low-grade timber, such as: warehouse dividers and stock shelves; yard toys; tool sheds, doghouses, and playhouses; tool chests, tool racks, and work benches; yard fences, trellises, and lattices; saw horses and step ladders. These items do not require finishing qualities or adherence to exact dimensions, and they could actually supply scraps for pallets. A more ambitious undertaking would be the establishment of a wood particle board or hardboard plant. Timber resources in the area could easily support either type of operation. In addition, the markets for both of these products offer vast potentials for future growth. (Author)

PB-170 125 **Field 5C, 11F, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Turck (F. B.) and Co., Inc., New York.
A STUDY OF NON-FERROUS METAL REFINING OPPORTUNITIES IN THE FOUR CORNERS STATES.
Nov 64, 253p
Contract Cc-6037

Descriptors: (*New Mexico, Economics), (*Colorado, Economics), (*Utah, Economics), (*Arizona, Economics), (*Refining (Metallurgy), Economics), (*Economics, Refining (Metallurgy), Ores (Metal sources), Lead, Zinc, Metals, Copper, Industrial plants, Site selection, Costs, Processing, Furnaces, Commerce, Natural resources, Blast furnaces, Mining engineering.

Identifiers: Area redevelopment.

It was the objective of this study to develop metallurgical processes for all minerals representing marketable values. Investigations of processes resulted in the selection of the Imperial Smelting Processes blast furnance as the basic refining unit. Additional refining units be included in the plans so that special high grade zinc, refined lead, and high nutrient value fertilizer can be produced. The proposed refining complex can become a reality. It offers many actual and many potentially valuable assets to the miner. It offers to the investor a profitable investment. It offers to the Four Corners Area a firm basis on which its mining industry can be revived and strengthened; it offers additional employment opportunities, and it provides refined metals and chemicals on which manufacturing industries can be developed.

PB-170 127 **Field 5C, 5A, 8F**
CFSTI Prices: HC$6.00 MF$1.50
Drexel Inst. of Tech., Philadelphia, Pa.
A FURTHER ANALYSIS OF LITTLE BUSINESS AND THE LITTLE BUSINESSMAN IN PHILADELPHIA, VOLUME I.
28 May 65, 301p

Descriptors: (*Economics, Pennsylvania), (*Commerce, Pennsylvania), Management engineering, Distribution (Economics), Costs, Industries, Aptitude tests, Sociology, Supervisory personnel.

Identifiers: Small business, Philadelphia, Negroes, Profit.

Carrying on the first year's study of small business in Philadelphia the following were the objectives during the second year: (1) To study the business characteristics and behavior of little business, i.e., firms with less than four employees. (2) To find the types of businesses likely to be most profitable. (3) To pinpoint community business areas where new small businesses will have a good probability of attaining success. (4) To explore the special problems of businesses operation by members of minority groups. (Author)

PB-170 128 **Field 5C, 11B, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Toler (Henry N.), Jackson, Miss.
RAW MATERIAL AND FEASIBILITY STUDY FOR CEMENT PLANT SMITH COUNTY, MISSISSIPPI.
15 Oct 64, 177p
Contract Cc-6020

Descriptors: (*Economics, Mississippi), (*Mississippi, Economics), (*Cements, Mississippi), (*Industrial plants, Mississippi), Geological survey, Natural resources, Limestone, Minerals, Feasibility studies, Geophysical prospecting, Costs, Commerce, Economic geology, Employment.

Identifiers: Area redevelopment.

A geological study was made of northern Smith County, Mississippi, of the Vicksburg formation to determine if limestone and marl suitable for making cement is present and outcrops in the area. It was found that the Glendon marl and limestone of the Vicksburg group does outcrop in several places across northern Smith County. However, in most places it is buried beneath sand and clay of the overlying Bucatunna and Catahoula formations. The market area for the proposed cement plant at Sylvarena, Mississippi, encompasses 162 counties in Mississippi, Alabama, Louisiana, Arkansas and Florida. Cement consumption in the market area totaled 13,528,000 barrels in 1962, up 98 percent since 1950. Consumption is forecast to reach 15,200,000 barrels in 1965; 18,100,000 barrels in 1970; and over 20,000,000 in 1975. A plant operating at 4,000 barrels a day or 1,348,000 barrels a year is recommended for construction at Sylvarena. Operating costs would total $3,321,087 a year or $2.46 per barrel at full capacity. At full production, net earnings would total $991,677 or $0.74 per barrel. Initial construction costs of the proposed plant would be $7,166,000 or $5.32 per barrel. The proposed plant would employ 133 people and exert a tremendous impact on the economy of the local area. (Author)

PB-170 130 **Field 5C, 8I, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Little (Arthur D.) Inc., Cambridge, Mass.
MINERAL-BASED EMPLOYMENT OPPORTUNITIES FOR THE FORT BERTHOLD RESERVATION. PART I. PRELIMINARY FINDINGS.
19 Jul 65, 105p
Contract C-66532

Descriptors: (*Economics, North Dakota), (*North Dakota, Industries), (*Industries, North Dakota), (*Minerals, North Dakota), Employment, Natural resources, Mining engineering, Coal, Electric power production, Clay, Construction, Rock (Geology), Mineral products, Fertilizers, Ammonia, Salts, Sodium compounds, Chloride, Sulfates, Chlorine, Chemical industry, Aluminum, Cements, Phosphates, Transportation, Labor, Concrete, Carbon, Steel, Manufacturing methods, Petroleum, Germanium, Uranium.

Identifiers: Area redevelopment, Indian reservations, Indians lignite.

This report represents the first part of the contract only and lists the findings and ranks possible projects in descending order of promise. The second and most important part of the contract, if carried to completion, would prepare a complete feasibility analysis of a commercial facility for not more than three of the ranked projects listed in this report. There are eleven mineral-based projects that might be established which could serve as employment opportunities for the Indian population of the Fort Berthold Reservation. These projects, ranked accordingly, are the following: (1) Electricity generated from North Dakota lignite; (2) manufacture of building materials; (3) ammonia fertilizer manufacture; (4) activated carbon production; (5) chlorine/caustic soda from salt; (6) sodium sulfate production; (7) aluminum production; (8) potash production; (9) phosphate fertilizers; (10) cement production and; (11) products from lignite through new technology.

PB-170 131 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Denver Research Inst., Colo. Industrial Economics Div.
ANALYSIS OF ECONOMIC OPPORTUNITIES, SISSETON RESERVATION, SOUTH DAKOTA. PHASE II,
by Dean C. Coddington, John G. Welles, and Carl von E. Bickert. Jul 65, 113p
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Indian Affairs, Aberdeen, S. Dak. and Area Redevelopment Administration, Washington, D. C. See also PB-170 093, PB-170 094.

Descriptors: (*Economics, South Dakota), (*South Dakota, Economics), (*Industries, South Dakota), Employment, Natural resources, Site selection, Electrical equipment, Electronic equipment, Electrical industry, Instrumentation, Assembling, Recreation, Packaging, Agriculture, Turkeys, Plastics, Molding, Rubber, Labor, Clothing.

Identifiers: Area redevelopment, Arts and crafts, Indians, Indian reservations.

Analysis indicates that certain labor-intensive electronic, electrical equipment, and instrument assembly operations can be profitably established on the Sisseton Reservation. Operations which are particularly suited for the Sisseton Reservation include: Cabling, Component Inserting, Coil Winding, Silk Screening, Memory Core Winding, Assembly of fractional horsepower motors, and Assembly of certain types of medical and laboratory instruments.

PB-170 132 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Dow (Louis A.).
THE ECONOMIC STRUCTURE AND DEVELOPMENT POTENTIAL OF THE TRI-COUNTY AREA OF AVERY, MITCHELL, AND YANCEY COUNTIES, NORTH CAROLINA,
by Louis A. Dow, and William J. Stober. 1966, 100p
Prepared in cooperation with Stober (William J.) for Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, North Carolina), (*North Carolina, Economics), Industries, Commerce, Industries, Population, Agriculture, Mining engineering, Geography, Charcoal, Employment, Minerals, Mica, Natural resources, Trees, Recreation.

Identifiers: Area redevelopment.

Contents-Population characteristics: General statements on migration, education, and incomes analysis of migration; a sectorial profile of the tri-county area: agriculture, mining, manufacturing, services and trade; barriers to economic development: psychological aspects, community facilities, geographical barriers, the development potential of the tri-county area.

PB-170 134 **Field 5C, 8I, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Industrial Consultants, Inc., Seattle, Wash.
AN ECONOMIC FEASIBILITY STUDY OF SODIUM SULFATE AND OTHER SALINE RESOURCES ON THE COLVILLE INDIAN RESERVATION.
Final rept.,
by Michael A. Rivisto. May 63, 103p
Contract 14-20-0650-1073
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Washington (State)), (*Washington (State), Minerals), (*Sodium compounds, Sulfates), Salts, Feasibility studies, Lakes, Paper industry, Transportation, Wood pulp, Labor, Carbonates, Magnesium compounds, Chlorides, Mining engineering, Economic geology, Natural resources.

Identifiers: Area redevelopment, Indian reservations, Sodium sulfates, Sodium carbonate, Magnesium sulfates, Sodium chloride.

Fifteen major lakes were selected for detailed investigation. Results of the study indicate estimated reserves of sodium sulfate in eleven intermittent brine and salt lakes to be 295,627 tons. Although varying quantities of sodium carbonate, magnesium sulfate and sodium chloride are found in the same lakes, none of these are present in sufficient quantity or required purity to be of economic value. In 1961, the kraft pulp and paper industry in the state of Washington required more than three times the proposed 35 thousand ton annual production from the Okanogan deposits. At the same time, a strong market exists in the Pacific Northwest providing a contingency reserve should competition become intense. The recovery of sodium sulfate from the lakes of the Colville Indian Reservation would be a somewhat marginal undertaking. The limited annual return on investment is not likely to interest private venture capital. Although the technology is well established for recovery of sodium sulfate from surface brines, the size, location and unique character of these deposits complicate their development. The relatively short life of the total operation translates the ordinary and usual problems of development and production into those which are more critical.

PB-170 135 **Field 5C, 11L, 8F, 2F**
CFSTI Prices: HC$5.00 MF$1.00
Battelle Memorial Inst., Columbus, Ohio.
THE FEASIBILITY OF LOCATING A PULP AND PAPER MILL IN THE CABELL-WAYNE AREA OF WEST VIRGINIA.
Final rept.,
by R. W. Toelle, and R. D. Schultz. 21 Jul 64, 165p

Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*West Virginia, Industries), (*Wood pulp, West Virginia), (*Paper industry, West Virginia), Transportation, Forestry, Water supplies, Labor, Site selection, Power supplies, Industrial plants, Employment, Costs, Roads, Feasibility studies.

Identifiers: Taxes, Area redevelopment, Wood industry.

Two factors, markets and forest resources, are primary determinants of the type of mill to be synthesized. These two factors were investigated most extensively because of the strong influence they exert upon both technical and economic feasibility. The remaining six factors - water, transportation, labor, plant sites, power, and other considerations - are secondary determinants of the mill. Of these secondary factors, water is of particular importance because of the costly treatment facilities that appear to be needed. Study of these eight factors resulted in the selection of a 150-ton-per-day sulfate pulp mill, paper mill, and converting plant producing sanitary and other tissues. (The term '150-ton-per-day' refers to the pulp mill only. The paper mill would actually produce approximately 177 tons per day because purchased softwood woodpulp is added to the paper furnish.) Total net revenue, required assets, and the cost of operations have been estimated for 250 and 300 days of operation per year. Comparison of the total net revenue projection and of the total operating costs (including sales, overhead, interest, taxes, etc.) results in estimates of profitability. (Author)

PB-170 136 **Field 5C, 8F, 5A**
CFSTI Prices: HC$3.00 MF$0.75
Dyer, Schoeller and Wirth.
USING PROFESSIONAL ASSISTANCE TO ACCELERATE AREA REDEVELOPMENT.
Oct 63, 76p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Connecticut), (*Connecticut, Economics), (*Professional personnel, Urban planning), Industries, Commerce, Employment, Labor, Money.

Identifiers: Area redevelopment.

A pilot study was conducted in the Danielson Redevelopment Area in the Quinebaug Valley of Windham County in Northeast Connecticut to determine whether use of professional assistance could accelerate the rate of economic development as reflected in applications to the Area Redevelopment Administration (ARA) for industrial and commercial loans. Direct contacts were made with significant industrial and commercial firms, and meetings were held with local bodies to identify possible projects and stimulate interest in the formulation of new ventures. As a resuet of the meetings, there was decided interest in financing by ARA. Many firms were stimulated toward expanding or diversifying their operations, and communities were encouraged to reappraise their economic development plans. 'Suggested Procedures for Managing Area Redevelopment' was prepared for possible use of other redevelopment areas seeking industrial expansion.

PB-170 138 **Field 5C, 8F**
CFSTI Prices: HC$7.00 MF$1.75
Army Engineer District, St. Louis, Mo.
REND LAKE RESERVOIR UPPER MISSISSIPPI RIVER BASIN BIG MUDDY RIVER, ILLINOIS.
General design memo.,
by Franklin F. Wehrle. 10 May 63, 343p Design memo. no. 2

Descriptors: (*Economics, Illinois), (*Illinois, Water supplies), (*Water supplies, Illinois), Roads, Costs, Design, Lakes, Dams, Storage, Geology, Soils, Founda tions (Structures), Roads, Electric power production, Construction, Materials, Public health, Recreation, Hydrology, Floods, Control.

Identifiers: Area redevelopment, Reservoirs.

Contents: I - Project authorization; II - Investigations; III - Local cooperation and views of local interests; IV - Location of project and tributary area; V - Project plan; VI - Departures from project document plan; VII - Hydrology; VIII - Geology; IX - Soils and foundation design; X - Other plans investigated; XI - Description of proposed structures and improvements; XII - Hydroelectric power study; XIII - Sources of construction materials; XIV - Reservoir management and public use; XV - Real estate requirements; XVI - Relocations; XVII - Cost estimates; XVIII - Schedules for planning and construction; XIX - Operation and maintenance; XX - Reservoir regulation; XXI - Health control; XXII - Economic analysis.

PB-170 139 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Bureau of Outdoor Recreation, Washington, D. C.
TOURIST AND RECREATION POTENTIAL, UPPER CUMBERLAND LAKES AREA OF TENNESSEE (CLAY, DEKALB, JACKSON, OVERTON, PICKET, SMITH, AND WARREN COUNTIES).
Jun 65, 121p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Tennessee), (*Recreation, Economics), (*Tennessee, Economics), Lakes, Transportation, Natural resources, Roads, Water pollution, Forestry, Animals, Fishes, Dams, Site selection.

Identifiers: Area redevelopment, Tourist industry, Recreational facilities.

Underlying study objectives were to: (1) Appraise existing tourism and recreation facilities and developments in or near the area under study, particularly as they relate to the present and prospective demand for outdoor recreation. (2) Identify and describe the recreation resources and other assets which appear to favor future growth of tourism and recreation in the study area. (3) Identify obstacles that must be overcome if the tourism and recreation growth potentials of the area are to be achieved. Identify general locations and types of facilities which appear to offer the greatest potential for recreation development. (5) Suggest actions necessary to achieve the tourism-recreation potentials of the study area. In line with the above objectives, the report that follows describes and locates the study area; summarizes the present status of tourism-recreation development; indicates present and prospective tourist markets; identifies major adjustments needed to achieve the tourism-recreation growth potentials; suggests locations which appear to offer good development possibilities, and recommends actions necessary if potentials are to be achieved.

PB-170 140 **Field 5C, 2F, 8F, 11L**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Interior, Washington, D. C.
FOREST PRODUCTION AND INDUSTRY UNDER THE AREA DEVELOPMENT ACT.
28 Mar 62, 11p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. report no. ARA Technical Leaflet no. 1.

Descriptors: (*Economics, Forestry) (*Forestry, Economics), (*Wood, Industries), Employment, Trees, Commerce, Distribution (Economics), Wood pulp, Paper, Processing, Natural resources, Instruction manuals.

Identifiers: Area redevelopment.

Throughout large portions of the forested regions in the United States--particularly in the Northeast, the Lake States and the Appalachians--Area Redevelopment offers opportunities to organize forest landowners and forest industry for expanded timber production and wood processing. In these forested regions, where other economic opportunities are frequently lacking, forests and forest industries are generally neglected or unproductive. A long history of mismanagement has reduced much of the forest land to a condition in which it can sustain only a portion of its potential output. The forest industries based on the wood resource have disappeared in some areas; in other areas, the industries consist of numerous small migratory units, often inefficient and underequipped in their processing and poorly connected with market outlets. The Area Redevelopment concept, based on concerted community action directed toward economic expansion, is ideally suited to solving the problems of underdeveloped forest production and industry. Without community action, these problems are not likely to be resolved; but with effective application of the Area Redevelopment concept to forest production and industry, economic stimulation and new job opportunities to both rural and urban segments of the area will result. This leaflet explores briefly the kinds of action required to provide stimulation to forest production and industry.

PB-170 141 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Minnesota Univ., Duluth. Dept. of Business and Economics.
A.R.A. DULUTH ECONOMIC AND EMPLOYMENT STUDY 1963.
Final rept.,
by Cecil H. Meyers, and Richard O. Sielaff. Jul 63, 144p

Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Minnesota), (*Minnesota, Industries), (*Industries, Minnesota), (*Employment, Minnesota), Electronics, Wood, Printing, Recreation, Commerce, Transportation, Labor, Site selection, Paper industry, Shipping (Marine), Water traffic, Costs, Forestry, Natural resources.

Identifiers: Area redevelopment, Duluth, Wood industry, Tourist industry.

During Phase I of the contract, an intensive study of the employment-unemployment record of the city was undertaken. This study provided a basis by which to evaluate and select the industries to be studied in the final phase of the contract. Five industries were then selected for further study. These industries were: The recreation industry; The electronics industry; The graphic arts industry; The wood products industry; and International trade and transportation. On the basis of the present studies as well as previously completed studies of population and unemployment, a number of general conclusions are drawn and a summary, of the industry studies is given. This material will constitute the final report of Phase II of the contract.

PB-170 142 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Candeub, Fleissig, Adley and Associates, Newark, N. J.
A PROGRAM FOR THE DEVELOPMENT OF TOURIST AND CONVENTION FACILITIES IN NIAGARA FALLS, NEW YORK.
1965, 181p
Availability: Original document in color until exhausted. Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Economics, New York), (*New York, Economics), (*Recreation, Economics), Population, Transportation, Rivers, Natural resources, Commerce, Roads, Costs, Employment, Urban planning.

Identifiers: Area Redevelopment, Tourist Industry, Recreation Facilities.

The major finding of this study is that tourism and conventions represent a major economic opportunity to the City of Niagara Falls. Full development of this potential could result in more than a thousand new jobs in the city. The basis for the projected expansion in tourist volume is the existing tourist resources of city and region. These resources provide a strong and broad base on which to build the projected expansion. At the present time (1964), over 4 million visitors are coming to the Falls area. By 1975, just by continuation of present trends, the Niagara Falls tourist economy can expect to attract 7.5 million persons. However, the study also indicated that by 1975 a potential flow of over 11 million visitors annually could be achieved if the essential investment in the expansion of facilities for the tourist industry are made. To realize this economic potential, the study recommends that the City of Niagara Falls should carry out a broad and comprehensive plan. The principal component of the plan is the Rainbow International Gardens - a 35-acre internation exhibition and amusement area - supported by a wide variety of other new tourist facilities and the Convention Center.

PB-170 144 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Candeub, Fleissig, Adley and Associates, Newark, N. J.
A PROGRAM FOR THE DEVELOPMENT OF TOURIST AND CONVENTION FACILITIES IN NIAGARA FALLS, NEW YORK.
Summary rept.
1965, 14p
Prepared in cooperation with Economic Development Administration, Washington, D. C. Availability: Original document in color until exhausted.

Descriptors: (*Economics, New York), (*New York, Economics), (*Recreation, Economics), Natural resources, Feasibility studies, Roads, Labor, Transportation.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

Niagara Falls has many outstanding possibilities for becoming an important tourist-convention center of the nation. It has, first and foremost, a remarkable natural wonder in its midst. By 1975, Niagara Falls may have about 11,000,000 visitors, spending $300,000,000 annually, if an ambitious plan to develop a tourist-convention industry is carried out. A study of the feasibility of the program for just such growth indicates exciting potential in this area. The report gives some of the salient points on why and how Niagara Falls can markedly improve its standing on the list of tourist favorites and, at the same time, give itself a healthy economic shot in the arm. (Author)

PB-170 145 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
C-E-I-R, Inc., Arlington, Va.
A TECHNIQUE FOR SELECTING CANDIDATE INDUSTRIES FOR SURPLUS LABOR AREAS.
May 62, 84p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*West Virginia, Industries), (*Kentucky, Economics), (*Industries, Economics), Labor, Employment, Statistical analysis, Materials, Transportation, Site selection, Commerce, Geography, Distribution (Economics), Managment planning.

Identifiers: Area redevelopment.

The report describes a technique and procedures for analyzing the market potential for either new industries or industries that can be expanded in surplus labor market areas. The technique focuses on the identification of industries with products which have a built-in market within the area and which are not now being produced in sufficient quantities to meet this market demand. It also considers the relative importance of transportation costs and the local availability of raw materials and semi-fabricated inputs, as well as other criteria, in evaluating the potential of these new industries. It further considers the relative impact of these potential industries on local employment and on use of the products of existing industry located in the area. The technique is applied to the Huntington-Ashland Standard Metropolitan Area. A number of industries are identified which appear to have a good potential for the area. The more promising industries from this list might be selected for more intensive studies of production and distribution costs, which would provide interested entrepreneurs with needed information for decisions on site location. (Author)

PB-170 146 **Field 5C, 11F, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Washington, D. C.
EVALUATION OF FEASIBILITY OF ANACONDA STEEL PLANT PROJECT.
24 Nov 61, 33p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Montana), (*Montana, Steel industry), (*Industrial plants, Steel), Industrial production, Iron, Feasibility studies, Costs, Commerce, Natural resources.

Identifiers: Area redevelopment.

A plant designed to produce 200,000 tons of steel ingots per year and 154,600 tons of pig iron per year, located at Anaconda, Montana, and utilizing the current copper slag production from the Anaconda Copper Company's operations in the adjacent site, will require an estimated capital investment of $38,900,000. Adding $2,500,000 for working capital results in a total capital requirement of $41,400,000. Direct manufacturing costs which exclude depreciation, general administration and overhead, local taxes and insurance, federal income tax, return on investment, and selling expense, will amount to an estimated $44.84 per ton for the steel ingots and $29.25 per ton for the pig iron based on a 350-day operation at design capacity. These costs also exclude interest payments for the outstanding debt capital involved in the financial structure of the project. (Author)

PB-170 147 **Field 5C, 11F, 8I, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Zontelli Bros., Ironton, Minn.
KRUPP RENN ROTARY KILN REDUCTION PROCESS APPLIED TO NON-MAGNETIC LEAN IRON ORES OF THE MESABI RANGE, UTILIZING ANTHRACITE FINE COAL AND NORTH DAKOTA LIGNITE CHAR,
by J. J. Simmons, S. R. Blanich, and G. A. St. Pierre. 1 May 63, 119p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Minnesota), (*Minnesota, Ores (Metal sources)), (*Ores (Metal sources), Iron), (*Steel industry, Ores (Metal sources)), North Dakota, Mining engineering, Furnaces, Coal, Reduction (Chemistry), Refining (Metallurgy), Processing, Costs, Manufacturing methods, Pellets.

Identifiers: Area redevelopment.

Conclusions: There is every indication that the Krupp Renn Process can prosper as a processing method for Minnesota Iron Ores. The pilot plant tests conducted at Rheinhausen, West Germany, demonstrated that the application of the Krupp Renn Process to Mesabi painty ores is technically feasible when using either Pennsylvania anthracite fires or North Dakota Lignite Char as the reductant. The use of luppen in the basic oxygen steel making process would provide a large present and an increasing future market. Luppen could also be utilized in the blast furnace, hot blast cupola, and electric furnace, and its demand would depend on the requirements of individual operators. It is reasonable to expect that the quality of luppen available from Minnesota ores would be equivalent to the type II or lower sulfur luppen produced at Essen-Borbeck. The Approximate analyses when using low sulfur reductants would be: 94.0% iron, 0.30% manganese, 0.20% phosphorus, and 0.15% sulfur. Minnesota has abundant resources including millions of tons lying in waste dumps.

PB-170 148 **Field 5C, 11F, 8I, 8F**
CFSTI Prices: HC$4.00 MF$0.75
R-N Corp., New York.
PRELIMINARY ENGINEERING STUDIES FOR APPLICATION OF THE R-N PROCESS TO LAKE SUPERIOR REGION IRON ORES. SECTION I. SAMPLING IRON ORES FOR R-N PROCESS TESTS. SECTION II. PRELIMINARY R-N COMMERCIAL FACILITY PROJECTION AND TECHNICAL REPORT,
by L. F. Heising, and R. C. Briggs. Dec 63, 106p
Prepared in cooperation with Bureau of Mines, Washington, D. C. and Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Great Lakes), (*Minnesota, Ores (Metal sources)), (*Wisconsin, Ores (Metal sources)), (*Michigan, Ores (Metal sources)), (*Iron industry, Ores (Metal sources)), (*Ores (Metal sources),

Iron), Refining (Metallurgy), Processing, Industrial plants, Furnaces, Pillets, Mining engineering, Costs, Transportation, Employment, Labor, Manufacturing methods, Feasibility studies, Site selection.

Identifiers: Area redevelopment, R-N Process, Briquettes.

The pilot plant and laboratory results demonstrating amenability of certain selected Lake Superior region iron ores to treatment by the R-N process for direct reduction in rotary kilns using coals or lignites are presented. Preliminary engineering studies based on these tests and on the extensive experience of the R-N Corporation are included which indicate good economic viability for the application of the R-N process to Lake Superior region ores. Recommendations for more detailed engineering studies are presented. (Author)

PB-170 149 **Field 5C, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Townsend (John R.), Alexandria, Va.
CARBOX PROCESS: DIRECT REDUCTION OF STEEL.
1 Nov 63, 9p

Descriptors: (*Ores (Metal sources), Reduction (Chemistry)), (*Iron, Ores (Metal sources)), (*Steel, Processing), (*Economics, Steel industry), Blast furnaces, Furnaces, Oxygen, Production, Phosphorus, Nitrogen.

Identifiers: Area redevelopment.

The laboratories of Mr. Merrill W. MacAffee were visited to witness a laboratory demonstration of the Carbox Process of direct reduction of steel from iron ore. The process employs a higher temperature than blast furnaces, up to 3200 F, the optimum being 3170 F. A new method for producing oxygen is part of the process. The estimate of $4.00 per ton of oxygen assumes a cost of $7.00 per ton from which $3.00 is subtracted for energy from by-product flue gases from the furnace. The higher temperature of making steel (3200 F) should reduce the phosphorus content of the steel, permit a method of using high phosphorus ores, which cannot now be used, by burning off the phosphorus as phosphorus pentoxide. The novelty of the process seemed to reside in high temperatures, a reducing flame, a combination of open hearth refinement and in general involved commercial processes. It should work for high iron content ores, and it may work for high phosphorus ores and those of low grade. There may be economic use for the lower grade pig irons which would represent the least this process can provide. A 1/4-ton-per-day pilot is recommended. If the pilot plant works, it can use the ores of Tennessee and New Mexico to advantage and a further byproduct can be expected in the form of nitrogen from the proposed oxygen plant. (Author)

PB-170 150 **Field 5C, 8I, 2A, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Mathews (Abe W.) Engineering Co., Hibbing, Minn.
FEASIBILITY STUDY FOR ESTABLISHING A PRODUCTION FACILITY BY THE REDWING PEAT CORPORATION OF NORTHERN MINNESOTA.
16 Oct 62, 175p
Contract Cc-5961

Descriptors: (*Economics, Minnesota), (*Minnesota, Industries), (*Soils, Additives), Fuels, Fertilizers, Processing, Feasibility studies, Packaging, Mineral products, Manufacturing methods, Costs, Tractors, Employment, Commerce, Natural resources, Industrial plants, Mining engineering, Economic geology, Chemical industry.

Identifiers: Peat, Area redevelopment.

The report indicates that the project for a horticultural peat-processing facility is feasible and financially attractive. Studies using 3 low-market selling prices and 3 production rates show a wide latitude in the ability to repay the debt and still have working capital. Depreciation would provide working capital but still not allow a net profit for distribution until full production was reached. (Author)

PB-170 151 **Field 5C, 8I, 9F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Washington, D. C.
EVALUATION OF THE CRANBERRY MAGNETITE CORPORATION'S CRANBERRY IRON MINE PROJECT,
by L. F. Heising and R. T. Sorensen, Jr. 20 Mar 63, 36p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, North Carolina), (*North Carolina, Magnetite), (*Magnetite, Mining engineering), Costs, Commerce, Processing, Labor, Ores (Metal sources).

Identifiers: Area redevelopment.

The Cranberry mine has no present developed markets sufficient to sustain the operation. The cost analysis based on the Bureau of Mines' estimate of operating costs indicates that the break-even point, without provision for taxes, depreciation of plant, or present debts, would be a 270-ton operation producing 55 percent heavy-media concentrate and 45 percent minus 1/4-inch material. If the company's low estimate of mine labor cost were accepted, the 270-ton plant producing 33 percent as heavy-media magnetite would about break even without provision for old debts, taxes, or depreciation. Reduction of the management cost would improve the profit potential. The 270-ton plant producing all heavy-media material or the 540-ton plant producing both concentrate types would provide a small profit if markets for this amount of product could be developed. It is believed that if the Cranberry mining operation were being evaluated by an engineer for a company that required a normal profit in its business ventures, the operation would be rejected because neither the profit or market potential are proved.

PB-170 153 **Field 5C, 6H, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Steelman and Hendrix, Washington, D. C.
FEASIBILITY STUDY FOR A GRAIN MILLING COMPLEX IN THE PITTSBURGH, PENNSYLVANIA AREA.
10 Aug 64, 81p
Contract Cc-6018

Descriptors: (*Economics, Pennsylvania), (*Pennsyl vania, Industries), (*Food, Processing), (*Industries, Pennsylvania), Feasibility studies, Cereals, Grinding, Animals, Population, Labor, Employment, Natural resources, Costs, Packaging, Commerce.

Identifiers: Area redevelopment, Pittsburgh, Food industry, Feed.

The feasibility of establishing a grain milling complex as defined: (a) wheat grain milling and (b) animal feed milling, is not feasible, either in terms of (1) providing additional employment or (2) being eeconomically attractive enough to induce major producers to enter the region. RECOMMENDATIONS: The Greater Pittsburgh Area should make a very active and well planned effort to introduce modern convenience food processing, packaging and distribution in the area and outbound. This should cover the gamut from breakfast foods to cake mixes, soup mixes, dehydrated, refrigerated and other packaged convenience foods. Modern convenience foods are having, and will continue to have, a universal acceptance with the American consumer and will outstrip the rate of population growth. This great change in the food consumption by Americans will greatly affect not only the use of milled grain products but those of fruit, meat, shortening, sweetenings and a multitude of other products. The operation of modern food mixing and packaging plants offers great opportunities to the Greater Pittsburgh Area. This is based upon the ever increasing demand for these kinds of foods and the fact that they can be produced, packaged, distributed and, in some cases, refrigerated in an area where basic milling is not done. (Author)

PB-170 154 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Real Estate Research Corp., Washington, D. C.
ECONOMIC ANALYSIS AND FEASIBILITY STUDY OF PROPOSED TRANSIENT FACILITIES AT EAST RIVER MOUNTAIN, BLUEFIELD, MERCER COUNTY, WEST VIRGINIA.
1963, 54p
Contract CC-6135

Descriptors: (*Economics, West Virginia), (*West Virginia, Economics), (*Recreation, West Virginia), Industries, Feasibility studies, Housing, Roads, Traffic, Costs, Employment.

Identifiers: Recreation facilities, Motor hotels, Tourist industry, Area redevelopment.

The site analyzed offers a favorable opportunity for development with a resort motor hotel which will not only provide an immediate and beneficial economic impact on the economy of the Bluefield, West Virginia community, but also will provide a much needed accommodation for travelers. The proposed resort motor hotel will enable visitors to this section of the country to stop and enjoy the beauty of the area in attractive surroundings. The hundreds of automobiles which stop daily at the East River Mountain Overlook are evidence of the extent of traveler interests in admiring the vistas. There are few spots in the entire Southern Appalachian Region where from a single vantage point more than six separate mountains are easily visible. The Bluefield area offers attractions related to the present and historic past of the coal mining industry with a wide scope of appeal to visitors from other states. It contains a wealth of unspoiled beauty which presently is inaccessible to the average visitor expect in a state prark. The initial development of 80 guest rooms, planned to provide for future expansion, should not conflict with facilities presently in operation at Skyland, Inc. and will have a beneficial effect on their patronage volumes. (Author)

PB-170 155 **Field 5C, 1E, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Bowman (Irving) and Associates, Charleston, W. Va.
ECONOMIC NEED AND CONSTRUCTION REQUIREMENTS FOR AN AIRPORT MODERNIZATION PROGRAM KANAWHA AIRPORT CHARLESTON, WEST VIRGINIA.
Feb 62, 69p
Prepared in cooperation with Speas (R. Dixon) Associates, Manhasset, N. Y. and Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*West Virginia, Airports), (*Airports, West Virginia), Construction, Runways, Terrain, Air traffic, Air transportation, Commerce, Jet planes, Costs, Industries, Site selection.

Identifiers: Area redevelopment.

A leveled runway base of 10,000 feet in length (8,000 feet paved with 1,000 foot over-runs) is required at Kanawha County Airport for adequate accommodation of jet transport aircraft currently in use by scheduled airlines and business operators. A requirement for reorientation of the present runway from 05-23 to 06-24 would appear indicated because of terrain obstructions in the approach zones. Operating restrictions as currently imposed at Kanawha Airport are of serious consequence to air commerce. Air passenger growth at Kanawha County Airport has lagged behind national air transport growth and behind economic indices of the West Virginia area. Modern air transport facilities are considered to be of substantial impor-

tance in the conduct of U.S. business, and is one factor considered in the selection of new industrial locations. (Author)

PB-170 156 **Field 5C, 5A, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
STUDY OF SELECTED COMPANY OPERATIONS FOR NOVA PRODUCTS, INC. WHITESBURG, GEORGIA.
1965, 17p
Proj. A-619

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Industries, Management engineering), Commerce, Cordage, Inventory, Industrial production, Industrial plants, Production control.

Identifiers: Area redevelopment.

The Nova Products, Inc. purchasing procedures should be reviewed. Every attempt should be made to reduce the cost of purchases (by purchase of larger quantities, competitive bids, search for new suppliers, quick payments to obtain cash discounts, etc.). It is highly desirable that an inventory control system be established which will reduce the physical inventory to an annual or semi-annual occurrence. A complete sales record system should be installed, to include a running record of sales for each product sold. If attempts to develop products which will offset the seasonal trend are unsuccessful, a departure from strictly cordage products should be considered. Ventures into other product lines can, without effecting present cordage consumption from the mill, result in greater sales and more effective utilization of employees. Increased activity would also result in the creation of more jobs.

PB-170 157 **Field 5C, 13M, 13B, 8F K**
CFSTI Prices: HC$7.50 MF$1.75
Army Engineer District, Louisville, Ky.
FEASIBILITY STUDY OF IMPROVEMENTS FOR NAVIGATION AND DOCK FACILITIES, LOWER SALINE RIVER OR SHAWNEETOWN, ILLINOIS.
Sep 64, 300p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. Appendix I Feasibility Study of Improvements for Navigation and Dock Facilities Lower Saline River or Shawneetown, Illinois by Tec-Search, Inc., Evanston, Illinois, January 1964.

Descriptors: (*Economics, Illinois), (*Illinois, Economics), (*Piers, Illinois), (*Water traffic, Illinois), Rivers, Feasibility studies, Harbors, Coal, Inland waterways, Shipping (Marine), Commerce, Employment, Costs, Transportation, Industries.

Identifiers: Area redevelopment.

CONCLUSIONS: (1) Construction of a slip-canal and harbor facilities near New Shawneetown, Illinois, is economically infeasible at this time or after a higher normal pool on the Ohio River is provided. (2) Improvement of the Saline River to provide for a 9-foot navigable depth to mile 7 and construction of harbor facilities at that point are economically infeasible at this time. (3) Construction of harbor facilities at mile 7 on the Saline River, after proposed improvement of the Ohio River to provide a normal pool level seven feet higher than the existing pool, is economically feasible, provided new coal mines will be established in contigous areas and use the facilities; and (4) Provision of public coal grading and transfer facilities at Old Shawneetown on the Ohio River are economically feasible. APPENDIX: The proposed development of a channel slip and harbor facilities on the Ohio River at Shawneetown, Illinois appears to be economically feasible on the basis of transportation savings for coal, grain, and sand, gravel and stone. (Author)

PB-170 158 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.25
Schrickel (Gene) and Associates, Arlington, Tex.
ECONOMIC FEASIBILITY STUDY FOR COMMERCIAL, RECREATIONAL, AND TOURIST FACILITIES IN AN ADJUNCT TO JEFFERSON, TEXAS.
Oct 63, 136p
Contract Cc-6008
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Texas), (*Texas, Economics), (*Recreation, Economics), Feasibility studies, Population, Boats, Costs, Management planning, Commerce, History, Employment, Rivers.

Identifiers: Area redevelopment.

This study set out to establish all data and information pertaining to the feasibility of building a Rivertown Complex. The data and information to be collected was presented in three phases. The first phase,was the RECONNAISSANCE, the second phase was DEVELOPMENT PLANS FOR RECREATIONAL FACILITIES, and the third phase was TOURIST ACCOMODATIONS AND PUBLIC FACILITIES ADJUNCT TO THE RIVERTOWN COMPLEX. Rivertown U.S.A. is not meant to be a carnival, but an area of development that will have 4 strong characteristics: (1) The existing old town restored to proper face and depicting its vintage. (2) Water front development at edge of river with 1870 relics on the ground on townside of the levee. (3) A good paddle wheel boat for pleasure trips on the river. (4) Flora and Fauna across the river. Based on the financial studies which have been made and other information available, it is logically concluded that the proposed Rivertown USA project is feasible. It presents no unusual construction, maintenance, or operation problems; and under proper management and administration, it should prove to be financially sound; its construction and operation will aid in reviving unemployment in the area; and from the stand point of restoring and preserving features of great historical interest, it is important. It is therefore concluded that the project should be carried out as planned.

PB-170 159 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Fenton, Conger and Ballaine, Inc., Seattle, Wash.
FEASIBILITY STUDY FOR RESORT DEVELOPMENT AT KAH-NEE-TA HOT SPRINGS ON THE WARM SPRINGS INDIAN RESERVATION OREGON.
1962, 96p

Descriptors: (*Economics, Oregon), (*Oregon, Economics), (*Recreation, Oregon), Feasibility studies, Water supplies, Sewage, Power supplies, Housing, Costs, Roads, Population, Natural resources, Climatology.

Identifiers: Area redevelopment, Recreation facilities, Indian reservations, Tourist industry, Motels.

Conclusions: Public acceptance of a resort development at Kah-nee-ta Hot Springs will be good. The general public is primarily interested in motel and cabin accommodations at Kah-nee-ta Hot Springs, with accommodations for between 100 and 200 people, with first preference for a cafeteria and secondly for kitchen facilities, and has only a minor interest in a cocktail lounge. The two main attractions that this location enjoys are hot water and sunshine, and both the general public and the existing clientele prefer to enjoy these attractions by swimming and fishing. The typical guests will be family units of four and five people expecting to stay, in a motel or cabin type of resort, some five to seven days; and in a campground and cabin type of development, 10 to 14 days.

PB-170 160 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Klein and Saks, Washington, D. C.
REVIEWS AND CRITIQUE OF PROVISIONAL OEDP's.
1962, 34p
Contract Cc-5828

Descriptors: (*Economics, Management planning), (*Management planning, Economics), Industries, Hand books, Education, Recreation, Agriculture, Rural areas, Reports, Labor, Employment, Natural resources, Forestry, Mining engineering, Site selection, Money, Urban planning.

Identifiers: Area redevelopment, Recreation facilities, Indian reservations.

Thirty overall economic development programs (OEDP's) were reviewed. Among these thirty, a few were outstanding in their coverage and supporting documentation; several were well thought out and well presented though lacking in depth in certain specific aspects; the larger number were lacking in important data though sound as to procedures and goals, while the remainder had major shortcomings in data support, in scope, and in projection. A most frequent deficiency of the OEDP's examined was either the lack of adequate available data or the failure of the representative redevelopment organization to appreciate fully the usefulness and role of the OEDP as a well thought out economic plan for the Area's present and future development. In a number of OEDP's studied, much of the data was incomplete or irrelevant to the planning concept. There were some deficiencies in all categories of the preliminary OEDP presentations. Generally, there was a lack of data on the ability of the Redevelopment Organization to take or to initiate desired actions. The Area Redevelopment Administration's brochure 'The Overall Economic Development Plan, - What is it, How to Prepare One for Your Community', issued in August 1961, has been the basic guide for the thirty OEDP's reviewed and evaluated in their economic aspects. It is very well organized, expressed in clear and understandable terms and quite complete in its listing of the subjects which are essential to the preparation of a good economic program.

PB-170 161 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Evans (Robert).
INDUSTRIAL LOCATION: A MODEL AND SOME EMPIRICAL TESTS,
by Robert Evans. 1966, 93p

Descriptors: (*Economics, Industries), (*Industries, Site selection), United States, Geography, Sampling, Labor, Employment, Wages, Business, Transportation, Materials, Massachusetts, Theory.

Identifiers: Area redevelopment, Taxes.

The conclusions of the first section were that: On the average, labor, materials, and personal factors each explain 15 per cent of locational decisions. Labor might be almost equal to markets in terms of the single most important reason for deciding upon a particular area. Taxes and local efforts to attract industry were of no consequence. In evaluating these findings with information from Massachusetts, note was taken of the fact that labor appeared to be of greater consequence in New England than in the country as a whole and special labor factors assoiated with research and development activities might be important. The findings for the Boston area confirmed the above, suggesting that Boston's employment growth relative to that of the United States was greatest in those industries employing more highly skilled labor (indicated in part by higher earnings), and in those characterized by rapid increases in engineering and scientific personnel (shown by rising ratios of nonproduction workers to production workers). The judgement that local efforts were apt to be of limited avail, while not directly tested, appeared substantiated in the employment record of three towns with prior employment problems, for their industries of growth were those of the general area in which they are located. (Author)

PB-170 163 **Field 5C, 11K, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Singmaster and Breyer, New York.
FEASIBILITY STUDY OF CHEMICAL INDUSTRY IN SOUTHWESTERN PENNSYLVANIA. PHASE III. SYNTHETIC ABRASIVES.
26 Apr 65, 103p

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Industries), (*Industries, Pennsylvania), (*Abrasives, Chemical industry), Silicon compounds, Carbides, Aluminum compounds, Oxides, Manufacturing methods, Industrial plants, Costs, Industrial equipment, Feasibility studies, Personnel, Commerce, Employment.

Identifiers: Area redevelopment, Silicon carbide, Aluminum oxide.

Recommendations: (1) A synthetic abrasives plant with only 10-20 percent of the design capacity should be built initially to supply customers within 250 miles of Reesedale. From 50-100 employees would operate this facility. A capital expenditure of $2.5-5.0 million will provide one-third of the electric furnace units, only one of the grit finishing facilities (for campaigning either silicon carbide or fused aluminum oxide), and none of the auxiliary buildings. Expansion to its design capacity would follow as needed. (2) It is imperative to emphasize the manufacture of special grades of finished grit that will sell at $400, or more, per ton. First, a market must be established for these special grades after the ability of the key operating group to meet the rigid specifications has been demonstrated. Then, a decision can be made for the type and capacity of abrasives plant best suited for the Reesedale site. (3) It is believed that a suitable operator for the proposed Reesedale plant will be one of the major integrated abrasives manufacturers, or a group of independent fabricators of abrasives that purchase crude and/or grit.

PB-170 164 **Field 5C, 8F, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Johnson (W. P.), Jr., Erie, Pa.
REPORT OF ON-SITE INVESTIGATION OF POTENTIAL INDUSTRIAL SITES AND TOURIST LOCATIONS IN THE UPPER BUFFALO CREEK WATERSHED, MANNINGTON, WEST VIRGINIA.
May 62, 34p
Proj. ARA-55.025.1
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*West Virginia, Economics), (*Industries, West Virginia), Floods, Recreation, Employment, Site selection, Water supplies, Dams.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

The Upper Buffalo Valley Watershed flood control project proposed by the Buffalo Valley Association, Inc. and its parent body, the Upper Buffalo Creek Watershed Association of Marion County, is within the sold jurisdiction of the U. S. Soil Conservation Service under the terms of P. L. 566 and is now in an inactive status until the local organization can assure S.C.S. of the availability of its share of the cost. The completion of the project will result in making available for development as industrial plant sites at least seven individual tracts totaling about 141 acres; presently subject to flooding; all reasonably well serviced or capable of being serviced economically with transportation and utility services. The completion of the project will enhance the attractiveness of the area as a tourist destination through the development of impoundments (small lakes) at each of the dam sites; and further through the development of both commercially and publicly operated outdoor recreational areas. Unless the project is completed, the Mannington area cannot hope to attract new industry except for a few small plants that require nothing more than water for sanitary purposes nor sites larger than a fraction of an acre. (Author)

PB-170 165 **Field 5C, 13K, 21D, 8F**
CFSTI Prices: HC$7.00 MF$1.75
Department of the Interior, Washington, D. C.
REPORT TO THE PANEL ON CIVILIAN TECHNOLOGY ON COAL SLURRY PIPELINES. APPENDIXES 1-16.
1 May 62, 341p

Descriptors: (*Economics, Pipes), (*Pipes, Coal), (*Transportation, Coal), Colloids, Costs, Industries, West Virginia, New York, New Jersey, Pennsylvania, Delaware, Maryland.

Contents: comparability of competing methods of energy transmission, a feasibility study and economic evaluation of a coal-water slurry pipeline system, high voltage transmission, pneumatic transmission, railroad-- technologic possibilities, oil slurry pipeline, feasibility study for coal transportation using belt conveyors, benefits from lower costs, effects on consumers, effect on the coal industry, effects on the petroleum and natural gas industries, effects on petroleum and natural gas transportation, economic impact on railroads, impact of construction and operation of pipeline, legal studies, cost of atomic energy.

PB-170 166 **Field 5C, 13J, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Booz, Allen and Hamilton, Inc., Chicago, Ill.
ECONOMIC SURVEY AND MASTER PLAN FOR PORT DEVELOPMENT THE PORT OF DETROIT.
Summary.
May 63, 59p
Contract Cc-5972

Descriptors: (*Economics, Michigan), (*Michigan, Harbors), (*Harbors, Michigan), (*Shipping (Marine), Michigan), Industries, Water traffic, Commerce, Cargo, Transportation, Employment, Costs, Great Lakes.

Identifiers: Area redevelopment, Detroit, Ports.

This report is divided into five major sections. The first section deals with the present and probable future volume of overseas cargo and the facilities required for handling it at the for-hire terminals. This cargo represents about 3% of Detroit's total waterborne commerce. The second section deals with the domestic and Canadian cargo handled by the for-hire terminals. This cargo is about 2% of total waterborne commerce through the port. The third section deals with the handling of domestic and Canadian cargo which flows over owner-used private docks. This cargo, which is largely bulk, accounts for the other 95% of waterborne commerce through the port, which in 1961 totaled 25 million tons. The fourth section discusses opportunities for development of water-oriented industries within the limits of the Wayne County waterfront. The fifth section deals with administrative and promotional factors related to the growth of the port.

PB-170 168 **Field 5C, 13B, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Carloss Well Supply Co., Memphis, Tenn.
WATER SURVEY - CLAY COUNTY WEST POINT, MISSISSIPPI,
by Orin Johnson. 20 Aug 63, 20p
Contract Cc-6015

Descriptors: (*Economics, Mississippi), (*Mississippi, Water supplies), (*Water supplies, Mississippi), Water wells.

Identifiers: Area redevelopment.

The supply well was developed that was to be pumped for the aquifer test, casing it with 8-inch pipe from the surface to a depth of 200 feet and running 6-inch casing from 200 feet to 810 feet. The lower 60 feet of the 6-inch was screened to let in the water. An observation well of smaller diameter was installed at a distance of 400 feet, as required for measuring interference effects of pumping the supply well. Hydrologists of the U. S. Geological Survey office conducted the pump test to determine the coefficients of storage and transmissibility of the water-bearing formation. A continuous water-stage recorder was operated on the observation well 400 feet away throughout the test making a complete record of water-level changes. The supply well was pumped at a continuous rate of 430 gallons per minute for 17 hours. After shutting off the well, water-level recovery was measured in the pumped well for 4 hours. The tests indicate that the water-bearing unit is an excellent source of water supply for West Point.

PB-170 169 **Field 5C, 2F, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Greenacres, Inc., Seattle, Wash.
1962 FOREST INVENTORY, FLATHEAD INDIAN RESERVATION DIXON, MONTANA. VOLUME I.
1 Aug 63, 70p
Contract 14-20-0650-1033

Descriptors: (*Economics, Montana), (*Montana, Forestry), (*Forestry, Montana), Wood, Trees, Aerial photography, Mapping, Data.

Identifiers: Indian reservations.

This inventory was undertaken to provide new aerial photos, accurate planimetric and timber type maps, forest inventory and growth data to the Flathead Indian Agency. This current information will assist Agency personnel in forest management and administrative planning.

PB-170 170 **Field 5C, 11F, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Washington, D. C.
EVALUATION OF THE FEASIBILITY OF NORTH RANGE MINING COMPANY'S CHAMPION IRON MINE PROJECT.
22 Jan 62, 34p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Michigan), (*Michigan, Ores (Metal sources)), (*Iron industry, Ores (Metal sources)), (*Mining engineering, Michigan), Pillets, Iron, Processing, Refining (Metallurgy), Industrial plants, Economic geology, Costs, Commerce.

Identifiers: Area redevelopment.

The Bureau of Mines has investigated a project proposed by the North Range Mining Company to expand facilities at its Champion mine on the Marquette Range of Michigan, and studied the Company's application to the Area Redevelopment Administration for financial assistance on the project. The Bureau's findings are submitted with the following prefatory qualifications: (1) The project is based on preliminary estimates, (2) the ore reserve is yet to be proved, and (3) the Company does not hold a mineral lease on the Champion mine extending over the full life of the proposed project. Excluding consideration of financial soundness or managerial competence of the North Range Company and an overall financial evaluation of the project, and accepting preliminary plans and cost estimates contingent on later verification by the Company or acceptance by ARA, the Bureau has determined that the project is basically sound and technically feasible, that the Company's capital cost estimate of $2,387,000 is reasonable, and that the cost of delivering high-grade iron-concentrate briquettes to the lower Great Lake ports will be $14.62 per long ton. North Range Company is submitting briquette marketing data to ARA in a form that can be used directly by that agency to evaluate the size of the market and determine the selling price. (Author)

PB-170 171 **Field 5C, 11L, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY: CORRUGATING MEDIUM MILL.
Oct 62, 71p
Contract Cc-5908

Descriptors: (*Economics, Missouri), (*Missouri, Industries), (*Paper industry, Missouri), (*Wood, Industries), Forestry, Wood pulp, Containers, Industrial plants, Site selection, Water supplies, Labor, Power supplies, Transportation, Commerce, Trees, Costs.

Identifiers: Area redevelopment, Wood industry.

Southwest Missouri offers several advantages to a firm considering a mill of this type. There are several sites favorable for the installation of a mill. At all of these sites there is still more than adequate wood available. Water is also available in adequate quantity. At Ste. Genevieve on the Mississippi River, and at Washington on the Missouri River, water transportation can be made available. Railroads and good highways serve all of the sites. The section on 'Feasibility,' indicates that a 200-ton-per-day mill would pay out in 14 years, if operated an average of 312 days per year at $115 per ton selling price. This is based on a very conservative estimate as to cost of plant and probable operating costs. If a selling price of $132 per ton is assumed by 1964, the mill would pay out in 10 years, if operated 312 days per year. A 300-ton-per-day mill would produce at a lower unit cost. At least one of the sites considered should be taken for a mill of not less than 200-ton capacity during 1963.

PB-170 172 **Field 5C, 11L, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY. WOOD PALLET MARKETING.
Oct 62, 51p
Contract Cc-5908

Descriptors: (*Missouri, Industries), (*Economics, Missouri), (*Pallets, Wood), (*Wood, Industries), Industries, Commerce, Industrial production, Management engineering, Employment, Transportation, Distribution (Economics), Labor, Costs.

Identifiers: Area redevelopment, Wood industry.

Pallet building is distributed throughout the timbered area of Missouri, and increased production will cause increased employment at the pallet mill, the sawmill, and in the woods. It is estimated that pallet sales in Missouri can be doubled to almost $9,000,000 by 1972. Specific recommendations to achieve this sales potential by overcoming present marketing and quality control difficulties include: establishment of a marketing association or cooperative with central sales office in St. Louis and field offices in major markets; establishment of a pallet warehouse in Salem, Missouri. The marketing organization would be responsible for all marketing functions, including: customer contact and sales, product design and application engineering, product warehousing, sales finance, traffic control, advertising. Emphasis on good marketing principles is the key to curing present ills and expanding the pallet industry in Missouri. Because producers are small, few of them can afford to create a good marketing organization. For this reason, it is recommended that an industry-wide marketing association having sufficient sales volume to support a good marketing organization be formed. (Author)

PB-170 173 **Field 5C, 8F, 13B**
CFSTI Prices: HC$1.00 MF$0.50
State-Local Waterfront Industrial Site Committee, Nashville, Tenn.
A PROGRAM FOR THE PRESERVATION AND DEVELOP- MENT OF INDUSTRIAL AREAS ALONG TENNESSEE'S WATERWAYS.
May 62, 25p

Descriptors: (*Economics, Tennessee), (*Tennessee, Industries), (*Industries, Site selection), (*Inland waterways, Industrial plants), Transportation, Water traffic, Employment, Labor, Rivers.

Identifiers: Area redevelopment.

The State-Local Waterfront Industrial Site Committee recommends that the State of Tennessee embark on an action program of preserving waterfront industrial lands for future use by industry. It believes that these scarce lands are vital to the future economic growth of the State and that the full economic potential cannot be realized unless positive steps are taken to assure the availability of these lands to industry when needed. This will be a coordinated program involving the State, local communities, and agencies of the Federal Government. (Author)

PB-170 174 **Field 5c, 8F**
CFSTI Prices: HC$4.00 MF$0.75
AREA, Inc., Arlington, Va.
SOUTHWESTERN PENNSYLVANIA ECONOMIC DEVELOPMENT PROGRAMS,
by Robert D. Campbell, and Hugh L. LeBlanc.
1962, 122p
Contract Cc-5947

Descriptors: (*Economics, Pennsylvania), (*Pennsylvania, Economics), (*Industries, Pennsylvania), (*Employment, Pennsylvania), Coal, Wood, Recreation, Natural Resources, Commerce, Mining engineering, Textile industry, Food, Agriculture.

Identifiers: Area redevelopment.

In July 1963, AREA, Incorporated personnel began a program of technical assistance to Cambria, Somerset, Fayette, and Greene counties in southwestern Pennsylvania. During the six month period of the contract, members of the firm made firsthand studies of each county. Two progress reports were submitted (28 August 1962 and 29 October 1962), and a supplemental report entitled 'A Program of Technical Assistance for Four Counties in Southwestern Pennsylvania' was written as a basis for discussions with representatives of Area Redevelopment Administration in Washington, D. C. In November, brief preliminary reports were written for each of the counties. These were submitted to ARA for criticism. In the present and final report the most important part is the section in which each of the counties has been reported on separately. The approach has been to suggest an action program for each county -- a program specified in a series of projects to be undertaken by the county. It is obvious that unemployment calls for immediate action but that the economic situation which has produced the unemployment can only be remedied by substituting a new economic situation; and this latter job is going to take time. Therefore, both short range (within 5 years) and long range (5 - 20 years) programs are suggested, based on the analyses made during the study period.

PB-170 175 **Field 5C, 8F, 13B**
CFSTI Prices: HC$4.00 MF$0.75
Marshall, Barr and Associates, Seattle, Wash.
ECONOMIC FEASIBILITY OF DEVELOPING TIDELANDS IN PADILLA AND FIDALGO BAY SKAGIT COUNTY STATE OF WASHINGTON.
Sep 64, 124p
Contract Cc-6087

Descriptors: (*Economics, Washington (State)), (*Washington (State), Industries), (*Industries, Washington (State)), (*Site selection, Puget Sound), Bays, Civil engineering, Feasibility studies, Soil mechanics, Foundations (Structures), Soils, Terrain, Employment, Natural resources.

Identifiers: Area redevelopment.

Site development at Padilla Bay is considered highly feasible. Per-acre development costs of 7,000 dollars are at parity with other industrial land developments at this time, along with the added attraction of large economical land areas available for future expansion programs. Fill materials and underlayment at the Padilla site are suitable for any type of heavy industrial loadings, thus making it more adaptable to a fully-integrated industrial development. Estimated employment during the physical development of Padilla Bay site is 90 men per 24-hour day, six days a week, for a period of 18 months. Site development at Fidalgo Bay is considered infeasible at this time. Per-acre development costs of 65,000 dollars are excessive for present consideration. Fill materials and underlayment at the Fidalgo site are marginal for loadings. Borrowed fill materials with removal of considerable underlayment make the site suitable only for limited light to medium industrial loadings. Excessive development costs, compounded with a lack of expansion area make the development of Fidalgo Bay even more infeasible. Estimated employment during the physical development of the site is 70 men per 24-hour day, six days a week, for a period of 20 months.

PB-170 177 **Field 5C, 18H**
CFSTI Prices: HC$4.00 MF$0.75
Denver Research Inst., Colo.
A METHOD OF MEASURING SHORT-TERM IMPACTS OF TECHNOLOGICAL CHANGE ON EMPLOYMENT AND OCCUPATIONS AS TESTED IN SELECTED POWER LAUNDRIES,
by James F. Mahar, and George E. Bardwell. Sep 65, 103p

Descriptors: (*Laundering, Manpower studies), (*Automation, Manpower studies), (*Sociometrics, Manpower studies), Job analysis, Measurement, Wages, Industries, Employment, Labor, Manufacturing methods, Power equipment, Production, Training.

Identifiers: Innovation (Technology), Prices, Technology.

For 20 representative plants in the family power laundry industry, the objectives of the proposed pilot study were: (1) To develop a framework of analysis to forecast the total potential (short-run) impact of automatic and technological change on the level and type of employment. (2) Within this framework, to construct estimates of the short-run impacts of technological change on the level and type of employment, considering impacts of (1) automation and mechanization, (2) internal variables which affect technological change, such as size of laundry, and productivity of existing equipment, and (3) a limited number of significant, external variables, namely prices and wage rates. Innovations were found in the shirt pressing, flatironing, and washroom sections of the laundries. Total production employment of the 20 laundry plants was approximately 1,200 in 1964, so the anticipated impact of these elements of technological change represents less than a two percent employment decline for the plants studied. No major innovation, still in the development stage with introduction anticipated prior to 1970, was identified. Beyond the three innovations, only minor technological changes are anticipated in the profile sections of the laundries investigated. In summary, the near future impacts of technological change on the 20 plants are expected to be small.

PB-170 179 **Field 5C, 11F, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Southwestern Engineering Co., Los Angeles, Calif.
ECONOMIC FEASIBILITY OF THE KRUPP RENN PROCESS FOR THE MINNESOTA IRON RANGES.
Dec 63, 236p
Contract Cc-5956

Descriptors: (*Economics, Minnesota), (*Minnesota, Iron industries), (*Refining (Metallurgy), Iron industry), (*Iron industry, Minnesota), Ores (Metal sources), Iron, Processing, Feasibility studies, Industrial plants, Site selection, Costs, Employment, Commerce, Site selection, Mining engineering.

Identifiers: Krupp Renn process.

The principal conclusion of this study is that a six kiln Krupp Renn plant is economically feasible for the Minnesota Iron Ranges. It is important to review the findings and conclusions that led to this basic conclusion: A three kiln Krupp Renn process is not sufficiently attractive to be considered commercially feasible. A six kiln Krupp Renn process located near the Cuyuna range and processing Zontelli ore appears to be the most attractive possibility. Sufficient semi-taconite ore reserves are available in the Minnesota area to sustain a capacity operation of a six kiln plant for twenty years. The plans of the steel industry to double oxygen furnace capacity by 1965, and Luppen's advantages in this application, make it likely that a $40/ton price could be obtained for Luppen on board ship at Lake Head. Financing appears quite attractive with the project requiring only $10,000,000 of equity capital. The project shows a 34.0% cash return on equity after tax - processing Zontelli ore at Cuyana operating at 100% of capacity and selling the Luppen at a $40/ton price on board ship at Lake Head. The six kiln plant would employ 375 men and thereby assist in the recovery of this depressed area of Minnesota. The project provides a source of nearly 700,000 annual short tons of Luppen to supplement internal U. S. sources in time of National Emergency. (Author)

PB-170 180 **Field 5C, 11L, 13C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY. BUILDING FIBERBOARD MILL.
Oct 62, 72p
Contract Cc-5908

Descriptors: (*Economics, Missouri), (*Missouri, Economics), (*Fiberboard, Industrial plants), Wood, Costs, Commerce, Industrial production, Site selection, Processing, Industries, Labor, Transportation, Feasi bility studies, Forestry, Trees, Natural resources.

Identifiers: Area redevelopment, Wood industry.

Insulating board of average density is considered in this report because it constitutes the largest portion of building fiberboard sales. It is assumed that the mill would produce 2,500 square feet of half-inch board for each ton of capacity. This board is satisfactory for sheathing or roof insulation. The board can be made with or without asphalt impregnation. No attempt has been made to analyze the feasibility of mills to produce tempered boards or to produce semirigid insulating board. Studies indicate that there is adequate market for another mill in the St. Louis area within the next two years. This mill would serve the St. Louis market in competition with other mills and still make a good profit. Freight is a considerable item of cost in the delivered price of building fiberboard; and any mill located within sixty to seventy-five miles of St. Louis would have a marked advantage over competitors. The feasibility study indicates that a 100-ton mill located within the general St. Louis area would pay out in less than nine years. This study assumed operation 312 days per year and extension of presently depressed product prices. It is recommended that not only should one mill be installed within the next two years but that at intervals of three to four years the State of Missouri should look into the possibility of additional capacity to maintain its position in this market.

PB-170 182 **Field 5C, 11L, 8F, 13C**
CFSTI Prices: HC$2.00 MF$0.50
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY: INSULATING BOARD MILL.
Aug 62, 44p
Contract Cc-5908

Descriptors: (*Economics, Missouri), (*Missouri, Industries), (*Fiberboard, Missouri), (*Wood, Industries), Forestry, Water supplies, Power supplies, Labor, Transportation, Costs, Feasibility studies, Industrial plants, Commerce, Site selection, Natural resources, Construction.

Identifiers: Area redevelopment, Wood industry.

Our market studies indicate that building fiberboard is increasing in use at a faster rate than other building materials. We have elected to consider a building fiberboard or insulating board of average density. We are assuming that the mill would produce 250,000 square feet of half-inch equivalent board for each ton of capacity. This board is satisfactory for roof insulation, but it is also satisfactory for sheathing. The board can be made either without impregnation or can be asphalt-impregnated. Based upon the assumptions made in our feasibility study, we find that a 100-ton mill located within the general St. Louis area would pay out in eight years, if operated 312 days per year. If operation were reduced to 250 days per year, the period of payout would be ten years, based on the assumptions used. We recommend that not only should one mill be installed within the next two years but that at intervals of three to four years the State of Missouri look into the possibility of additional mills to maintain its position in this market. The market is growing and new mills using Missouri woods should grow at least as fast as the overall market trend. We have indicated six sites within the ARA-designated counties in Missouri, all of which are satisfactory for the location and operation of a building fiberboard mill.

PB-170 183 **Field 5C, 11L, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Ebasco Services, Inc., Chicago, Ill.
MISSOURI WOOD STUDY: WHITE BOARD MILL.
Aug 62, 43p
Contract Cc-5908

Descriptors: (*Economics, Missouri), (*Missouri, Industries), (*Paper industry, Missouri), (*Wood, Industries), Forestry, Natural resources, Site selection, Labor, Power supplies, Water supplies, Commerce, Transportation, Feasibility studies, Wood pulp, Costs, Industrial plants, Roads.

Identifiers: Area redevelopment, Wood industry.

This study covers feasibility of locating one or more pulp and paper mills in Missouri. One of the problems faced, in considering a mill to utilize the wood in Southeastern Missouri, was finding satisfactory sites with adequate water but in an area where there would be minimum conflict with recreational interests, Two sites have been selected: near Leadwood, in St. Francois County; and in the general area of Leeper, in Wayne County, on the Black River. The proposed mill, which could be located at either of the above sites, could produce bleached kraft paper of a type satisfactory either for foodboard, greeting cards, printing papers, fine writing paper, index cards, tags, or any other good quality bleached paper product. The two sites are substantially the same from the standpoint of feasibility. Estimates, based upon industry averages for cost, indicate that a white paper mill located at either site, with a capacity of 300 tons of paper per day, would pay out in 18 years if producing coated and uncoated bleached paper; or in 21 years if the equipment were sized for adequate down time to produce the necessary variations in product. This is based upon assistance from the Area Redevelopment Administration in financing. If only 250 days' operation per year were assumed, the payout periods would be 24 and 29 years, respectively.

PB-170 184 **Field 5C, 11F, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ford, Bacon and Davis, Inc., New York.
MARKET FOR IRON AND STEEL PRODUCTS AVAILABLE TO A NEW PRODUCER OPERATING A STRATEGIC-UDY DR PLANT IN NORTHEASTERN MINNESOTA.
6 Dec 62, 70p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Minnesota), (*Minnesota, Iron industry), (*Iron industry, Minnesota), (*Steel industry, Minnesota), Iron, Steel, Industrial plants, Commerce, Industrial production, Reinforcing materials, Refining (Metallurgy), Employment, Ores (Metal sources), Transportation.

Identifiers: Area redevelopment.

A study was made of the iron market in the basic market area which might be served by a proposed Strategic-Udy direct reduction plant located at Duluth, Minn., or in the vicinity of Chisholm-Hibbing, Minn. The purpose of this study was to determine and report on the type and volume of products (principally pig iron and billets and possibly reinforcing bars) that might be sold by this plant in the next 5 years, assuming that the products (derived from low-grade ores available in northeastern Minnesota) would meet customer specifications and be available at or below prices in the market area. The report includes, along with other relevant matters, a determination of the basic market area and principal prospective customers, the results of interviews with cross sections of prospective customers, a review of freight rates and their probable effect on potential sales of the products, a resume of the effect of availability and price of scrap iron and pellets on the market prices that might be obtained for the products, and a study of general economic and industrial trends in the market area in relation to the probable demand for the products.

PB-170 185 **Field 5C, 11L, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Department of Agriculture, Washington, D. C.
REPORT ON SEVERAL ASPECTS OF THE PROPOSED BRICE LUMBER COMPANY SAWMILLING ENTERPRISE AT FAIRBANKS, ALASKA,
by H. Hallock. Feb 62, 22p
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Economics, Alaska), (*Alaska, Industries), (*Wood, Alaska), Industrial plants, Feasibility studies, Costs, Commerce, Forestry, Roads, Transportation, Natural resources.

Identifiers: Area redevelopment, Wood industries.

The Brice Lumber Company can be successful if the following presently undetermined factors are determined to be favorable. (1) The volume of timber available in the Fairbanks area is sufficient for 25 years of operation. (2) The price of stumpage in the Fairbanks area does not advance out of proportion to the other costs and lumber value. (3) The cost of roads does not exceed approximately $10 per MBF. (4) Lumber grade recovery is 80 percent 'standard or better.' (5) Sales and production can be built to 3,000 MBF or more within 3 years of startup. (6) Access to working capital of no less than $75,000 and preferably $100,000 to $125,000 is established. (7) The total investment in the physical plant and equipment and land is held to a maximum of $240,000. (8) The cost of freight on 'competing shipped-in lumber' continues to be at least one-third the wholesale delivered price in Fairbanks. The success of this operation really depends on the 'cushion' pro-

vided by the high freight on shipped-in lumber. Should the transportation picture change to reduce this 'cushion' appreciably, the Brice operation would be in serious trouble. Recommendations are summarized as follows: (1) Make some kind of road cost estimate. (2) Determine the grade recovery for Fairbanks spruce. (3) Require adequate working capital.

PB-170 186 **Field 5C, 13M, 13B, 8F K**
CFSTI Prices: HC$4.00 MF$0.75
First Research Corp., Miami, Fla.
A STUDY OF THE FEASIBILITY AND ECONOMIC NEED FOR A PORT FACILITY TO BE LOCATED IN JACKSON COUNTY, FLORIDA ON THE APALACHICOLA RIVER.
Mar 63, 116p
Contract Cc-5974

Descriptors: (*Economics, Florida), (*Florida, Economics), (*Piers, Florida), (*Water traffic, Florida), Georgia, Alabama, Rivers, Feasibility studies, Harbors, Industries, Costs, Transportation, Employment, Shipping (Marine), Commerce.

Identifiers: Area redevelopment.

SUMMARY: If Jackson County were to build a port facility, on the Apalachicola River, it would, in effect, have to compete with those that are in existence, or being planned along the Apalachicola, Chattahoochee, and Flint Rivers. The purpose of these ports, most of which are State-supported, is to encourage industrialization. This competition will place Jackson County at an extreme disadvantage since its capacity to finance and support a port facility would be borne by its own people only, as the State of Florida has no such support program. A competitive-type inland port facility in Jackson County would range in cost from about $300,000 to $400,000. This would enable the port to handle most of the commodities that are now being shipped on the waterway system with the exception of liquid bulk commodities. The annual operating cost during the first years of operation would approximate $63,000 per year including $27,000 for debt service and retirement. The proposed port facility is not regarded as justified at this time on the basis of meeting an existing demand. The need for a port facility should first be established before efforts are directed toward meeting that need. (Author)

PB-170 187 **Field 5C, 6H, 8F, 2B**
CFSTI Prices: HC$3.00 MF$0.75
Aquatic Controls Corp., Hartland, Wis.
FEASIBILITY STUDY REPORT ON HARVESTING AND PROCESSING OF AQUATIC PLANTS FROM CADDO LAKE.
Final progress rept., phase 3,
by Howard W. Stern. Apr 64, 59p
Contract Cc-5992

Descriptors: (*Economics, Texas), (*Texas, Industries), (*Plants (Botany), Lakes), (*Food, Industries), Processing, Drying, Costs, Feasibility studies, Commerce, Industrial plants, Employment, Recreation, Agriculture.

Identifiers: Area redevelopment, Tourist industry, Feed.

The feasibility program established the following information: (1) Proof that the aquatic harvesters were effective and efficient while operating on Caddo Lake, even though certain areas were heavily infested with stumps and other underwater objects. (2) That the by-product of said underwater vegetation can be produced economically and sold at a reasonable profit. (3) That there are adequate raw materials to warrant the establishment of a permanent plant at Caddo Lake. (Author)

PB-170 188 **Field 5C, 11L, 8F, 2F**
CFSTI Prices: HC$6.00 MF$1.25
Horn (Allen F.), Syracuse, N. Y.
OPPORTUNITIES FOR FOREST-BASED INDUSTRIES IN PENNSYLVANIA. A MANUAL FOR THE DEVELOP- MENT OF PENNSYLVANIA'S WOOD-USING INDUSTRIES,
by Allen F. Horn and Paul H. Graham. Jan 1965, 264p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Pennsylvania), (*Pennsyl vania, Industries), (*Wood, Industries), (*Industries, Wood), Forestry, Wood pulp, Plywood, Employment, Labor, Paper industry, Transportation, Fuels, Water supplies, Power supplies, Electric power production, Natural resources, Commerce, Trees.

Identifiers: Area redevelopment, Taxes, Furniture.

Potential locations in Pennsylvania can offer excellent possibilities for manufacture of the following 20 wood product groups. Products with restricted locations: Pulp and paper, Veneer and plywood, Treated or overlaid building panels, Wood wool and cement boards, Vats, tanks, and cooling towers, Wood turnings and carvings, Wood flooring, Wood interior shutters and louver doors, Hardwood dimension, Wood contract furniture, and Wood upholstery frames. Products free to locate throughout the state: Compressed wood particle paper plugs, Compressed fuel logs, Woodenware and novelties, Wood educational and miscellaneous toys, Wood doors, Commercial custom wood chairs, Wood fencing and poles, Particleboard, and Densified wood.

PB-170 190 **Field 5C, 7A, 8F, 8I**
CFSTI Prices: HC$5.00 MF$1.00
Aase (George) and Associates, Inc., Tallahassee, Fla.
FEASIBILITY STUDY OF A PROPOSED LIME INDUSTRY IN REDEVELOPMENT AREA A, WEST FLORIDA,
by George Aase, Frank Andrews, Ney Landrum, andErnest Bishop. 12 Dec 62, 176p
Contract Cc-5836

Descriptors: (*Economics, Florida), (*Florida, Economics), (*Chemical industry, Calcium compounds), (*Limestone, Florida), Limestone, Feasibility studies, Costs, Processing, Monoxides, Hydrates, Commerce, Transportation, Industrial plants, Natural resources, Mining engineering, Labor.

Identifiers: Area redevelopment, Lime.

Raw material needed for lime production can be obtained, delivered at any of several possible plant sites at prices which will permit economical and competitive production of quick and hydrated lime. Because of the advantages of lower transportation costs, a Marianna plant could compete successfully in a large primary market area. Because of local deficiencies of supply, a Marianna plant could expect a measure of success in an even broader secondary market area even without distinct transportation advantages. The combined reported consumption in both market areas is an estimated 755,000 tons per year, of which a Marianna plant could expect to capture about 80,000 tons. A Marianna plant would enjoy a fairly strong price position which should give it flexibility in competing for markets while at the same time assuring an ample margin of profit. It appears evident that a lime plant of about 80,000 tons per year capacity would be a successful and profitable business venture. (Author)

PB-170 191 **Field 5C, 13B, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Candeub, Cabot and Associates, Scranton, Pa.
FEASIB ITY STUDY FOR A MUNICIPAL AUDITORIUM IN THE CITY OF WHEELING, WEST VIRGINIA.
Jun 62, 100p
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Urban planning, West Virginia), (*West Virginia, Urban planning), (*Economics, West Virginia), (*Recreation, Buildings), Costs, Feasibility studies, Commerce, Site selection.

Identifiers: Area redevelopment, Recreation facilities.

The Feasibility Study indicates that there is a need for an auditorium in the City of Wheeling and that such an auditorium would result in substantial benefits to the local economy. In addition, if the auditorium structure is properly managed and if certain commitments are received from the two major users of the auditorium as projected in this study, yearly operating costs should be met. However, it may be several years before the full revenue estimates are achieved, and since the estimates do not indicate sufficient coverage of these operating costs, the City should be prepared to meet a yearly operating deficit in the first few years of operation.

PB-170 194 **Field 5C, 2F, 8F, 11L**
CFSTI Prices: HC$2.00 MF$0.50
Northwest Economics, Inc., Tacoma, Wash.
BEST METHOD OF MARKETING TIMBER FROM THE MAKAH INDIAN RESERVATION, WASHINGTON.
Feasibility study.
Mar 65, 37p
Contract C-84-65 (Neg.)

Descriptors: (*Economics, Washington), (*Washington, Forestry), (*Forestry, Washington), (*Wood, Industries), Employment, Trees, Costs, Water traffic, Transporta tion, Labor, Plywood, Wood pulp, Feasibility studies, Commerce, Processing.

Identifiers: Area redevelopment, Indian reservations, Wood industry.

Conclusions: (1) Facilities for water transportation of logs are essential to make logging at Neah Bay economically sound. They are now under construction. (2) Facilities for barge transportation of lumber and chips are essential if logs are to be processed at Neah Bay. It appears that the facility now being built can be adapted to handling barges by additional construction. (3) The only markets that appear likely to provide a return to stumpage higher than the present stumpage price for Makah timber are export sales of logs (especially spruce) and processing logs into lumber and chips at Neah Bay by newly-developed machinery. (4) The best course appears to be to export the highest-grade logs (especially spruce) and trade logs more than 18 inch in diameter for smaller logs that would otherwise be used for pulpwood. (5) Several thousand acres of second-growth timber on the reservation are in need of thinning. (6) The program recommended in this report seems well adapted to the available labor force.

PB-170 195 **Field 5C, 2F, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Indian Affairs, Billings, Mont.
FOREST INVENTORY, FLATHEAD INDIAN RESERVA- TION MONTANA,
by Ned O. Thompson. 8 May 64, 29p
See PB-170 169.

Descriptors: (*Economics, Montana), (*Montana, Fores try), (*Forestry, Montana), Wood, Trees, Data, Mapping.

Identifiers: Indian reservations.

This report is the result of a timber inventory made in 1963. It provides one of the tools necessary for basic long range forest management planning. The inventory applies generally to the coniferous forests of the entire Reservation. It will be an aid in preliminary planning of timber sales, but it does not eliminate the need for detailed studies of speci-

fic areas to be included in any given timber sale. Certain observations and recommendations are made on page 4 of the Appendix. One of these is the need for additional topographic mapping. This has already been requested from U. S. Geological Survey. Additional analysis of access problems, log and lumber grade data, etc. comprise a portion of routine forest management planning and pre-timber sale preparation. The preface includes the determination of gross board feet volumes for the 10-inch DBH class for all species and summarizes gross board feet volumes.

PB-170 196 **Field 5C, 8E**
CFSTI Prices: HC$6.00 MF$1.25
Mississippi Industrial and Technological Research Commission, Jackson.
STUDIES IN THE ECONOMIC STRUCTURE OF THE STATE OF MISSISSIPPI, VOLUME I,
by John G. D. Carden, and F. B. Whittington, Jr.
1964, 199p
Contract Cc-5963
Availability: Original document in color until exhausted.

Descriptors: (*Economics, Mississippi), (*Mississippi, Economics), (*Industries, Mississippi), Statistical analysis, Animals, Food, Fishes, Textiles, Textile industry, Swine, Vegetables, Vegetable oils, Transportation, Metals, Crustacea, Machines, Chemicals, Powder metallurgy, Wire, Material forming, Steel industry, Employment.

Identifiers: Area redevelopment, Feed.

Ten industries, shown to be 'missing links' in the development of families of structurally related industries, are stressed for accelerated developmental efforts. The ten industries are: feed crops; commercial fishing; textile products; all other chemicals except agricultural chemicals; miscellaneous agricultural products such as hogs, and vegetables; miscellaneous food products such as the further processing of soybeans and cottonseed oil and vegetables; transportation equipment; primary metals; fabricated metal products; and non-electrical machinery. To assist in the development of these ten industries, certain research programs are indicated: optimum feed mixes for livestock; economics of hog production; improved methods of predicting potential shrimp catch; feasibility of producing, such chemical products as paint, varnish, plastic resins, synthetic glue, chlorine, caustic soda, carbon dioxide and sulphuric acid; and the feasibility of the location in the state of an integrated textile mill, powder metallurgy operation, wire drawing plant and a merchant shape steel mill.

PB-170 197 **Field 5C, 8F, 5A**
CFSTI Prices: HC$3.00 MF$0.75
Development Counsellors International, Ltd., New York, N. Y.
PROMOTING NEW INDUSTRY: A PRACTICAL GUIDE.
1965, 75p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Industries), (*Industrial plants, Site selection), (*Instruction manuals, Site selection), Management planning, Commerce, Data, Reports, Industrial relations, Urban planning.

Identifiers: Area redevelopment.

The report presents a guide for communities seeking to attract industry which would help them improve their promotional efforts and use their limited funds more effectively. The report was edited and subsequently published as the ARA Bookshelf Publication, 'Attracting New Industries.'

PB-170 198 **Field 5C, 6H, 2B, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Lockwood Greene Engineers, Inc., New York.
THE ECONOMIC FEASIBILITY OF A SUGAR BEET PROCESSING FACILITY IN AROOSTOOK COUNTY, MAINE.
2 Dec 63, 104p Rept. no. 63134
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Maine), (*Maine, Industries), (*Food, Industries), (*Industrial plants, Maine), Feasibility studies, Industries, Vegetables, Carbohydrates, Transportation, Wages, Labor, Employment, Costs, Commerce, Processing, Site selection, Agriculture.

Identifiers: Area redevelopment, Sugar beets, Income.

The economic feasibility is very favorable and benefits which will accrue from the establishment of a beetsugar industry in Aroostook County are impressive. The supporting conclusions are summarized as follows: (1) The New England market will benefit from a third sugar supplier and can absorb the 1 million bag output of a Maine beet plant; (2) Capital cost of the plant will be $17,500,000; (3) The processor will receive an average return of 17.5% on capital invested after Federal income taxes. Such profits to the processor are based on 'lease-back' financing which includes the participation of The Area Redevelopment Administration of the U. S. Depart of Commerce; (4) The annual benefits which will accrue to the State of Maine will approach $6,803,000. The transportation industry of New England will benefit by $1,506,000 and New England sugar consumers will save $745,000. (Author)

PB-170 199 **Field 5C, 8I, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Huntley and Huntley, Inc., Pittsburgh, Pa.
GEOLOGICAL RECONNAISSANCE AND EVALUATION OF AN ORE DEPOSIT LOCATED IN MONROE COUNTY, TENNESSEE.
16 Apr 63, 56p
Contract Cc-5984

Descriptors: (*Economics, Tennessee), (*Tennessee, Ores (Metal sources), (*Ores (Metal sources), Iron), Mining engineering, Iron industry, Processing, Chemical analysis, Economic geology, Natural resources.

Identifiers: Area redevelopment.

There are 192,000,000 short tons of iron ore material averaging 15% iron content or more in the selected areas drilled. In addition there are 1,955 acres of iron ore material of undetermined quality and thickness. In the area not drilled, there is a very large amount of iron ore material averaging 10% iron content. The results of beneficiation studies indicates that this matérical can be up-graded economically to an iron content range from 28% to 60% ; pellets. Drilling so far completed indicates 96,000,000 short tons of ore concentrate of 20% averaging iron content. This amount of concentrate should be able to supply a 500,000 ton per year iron facility for 38 years. Recommendations: More auger drilling should be done on close centers (probably 100 feet) in selected areas for the purpose of establishing minimum blocked out iron ore material reserves. A pilot plant operation should be begun immediately to determine the optimum methods to be employed in each stage of the beneficiation. Bulk samples (approximately one ton of material) should be taken of both the higher iron ore content material and the low content material to actually determine the best method of mining, and the feasibility of recovering the fines only from the low iron content material.

PB-170 201 **Field 5C, 6H, 8A**
CFSTI Prices: HC$1.00 MF$0.50
Maine Dept. of Sea and Shore Fisheries, Augusta.
YORK COUNTY, MAINE: SHELLFISH RESOURCE SURVEY AND DEPURATION STUDIES.
28 Sep 64, 16p
Contract Cc-5928

Descriptors: (*Economics, Maine), (*Maine, Shellfish), (*Shellfish, Cleaning), (*Seafood, Industries), Pelecypoda, Water pollution, Rivers, Processing, Commerce, Costs.

There are not enough clams, at present, in moderately polluted areas to support a clam depuration plant for York County. There are a few areas which could contribute to such a plant. Oysters in the Piscataqua River offer the greatest possibility for economic development, and the method of use should be carefully considered. The standing crop has a value of close to a quarter-million dollars if it could be harvested and sold. Three possibilities exist for this resource: (1) pollution abatement may be expected to release it again to a wild fishery, (2) these oysters may be relaid to clean bottom for cleasing, or (3) a seed oyster industry might be developed. Depuration of these oysters in a cleansing plant is not feasible at this time because of the high levels of contamination. A low-cost processing plant is only a partial solution to reducing costs to a point where the Maine clam can compete with the Maryland clam on a year-round basis, because the greatest percentage of the production cost lies along the harvesting end of the production chain. Under current conditions it appears that the only period when private enterprise could make a fair profit on cleansed clams is during the tourist season (8 - 10 weeks) in the summer when steamer clams retail as high as $16.00 per bushel.

PB-170 216 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Ohio Univ., Athens. Div. of Research.
COMMERCIAL TOURISM POTENTIAL OF HOCKING COUNTY, OHIO,
by Donald C. Darnton, Ralph Gray, Albert J. Korsok, and John Lymberopoulos. Mar 64, 116p
Monograph-2
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Ohio), (*Ohio, Economics), (*Recreation, Ohio), Mining engineering, Coal, Skis, Boats, Lakes, Natural resources, History.

Identifiers: Area redevelopment, Tourist industry, Reservoirs, Recreation facilities.

Recommendations: (1) Tourist demand for lodging should reach 500 units in the summer and fall to an average of 200 units during the remainder of the year. Weekend demand should exceed the lower figure throughout most of the year. Lodging accommodations should be located near Logan, Lake Logan, Burr Oak, Hocking State Park, and the coal mine. (2) Hocking State Park needs more facilities to serve visitors including a restaurant and riding stables. Enjoyment of the park could be increased by using printed trail guides, evening ranger talks, and safeguards for winter tours. (3) Both members and non-members of Hide-A-Way Hills will benefit from the addition of a motel and shopping center. There is a potential for similar vacation home developments in other sections of the state, and for smaller developments. Southeastern Ohio could be the location of a large resort, which could handle large conventions. (4) Lake Logan offers opportunities for combined public and private tourist development. Publicly developed facilities could include a bathing beach, boat ramps, campgrounds, picnic areas and hiking and bridle trails. (5) A coal mine and life of the turn-of-the-century period could be developed in either of two ways. A mine and mining museum could be the focal point with buildings in local towns restored to show the way of life of the period. Or a replica of a town could be built at the site of the mine and museum. The village could include an opera house, saloon, restaurant, print shop, pottery shop.

PB-170 223 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Bureau of Outdoor Recreation, Washington, D. C.

TOURIST AND RECREATION POTENTIAL: MIDDLE ISLAND CREEK COUNTIES OF PLEASANTS, TYLER AND DODDRIDGE, WEST VIRGINIA,
by James N. Lowe, David Brown, Robert H. Myers, Henry W. Dill Jr., and Clifton W. Housley.
Jun 63, 50p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*West Virginia, Economics), (*Recreation, West Virginia), Lakes, Turkeys, Transportation, Rivers, Water pollution, Fishes.

Identifiers: Area redevelopment, Recreation facilities, Tourist industry.

Recommendations: That the recreation potential of the area be developed with a minimum of interference with existing economic activities. That a series of low-water dams be constructed on the main stem of the Middle Island Creek to stabilize the water level and to expand the water surface for fishing, swimming, boating, water-skiing, and other recreation uses. That the 'Jug' area, including the present County Home for the Aged and improvements, be acquired by the Middle Island Creek Development Authority and be developed as a tourist attraction and recreation facility. That a large number of small lakes be created on the upper reaches of the Middle Island Creek and its tributaries for fishing, boating, swimming and other activities. That the Middle Island Creek Development Authority, in cooperation with the State Department of Highways, plan a system of access roads that will be in keeping with development programs. That a State owned and managed public hunting area be established in western Doddridge County along the South Fork of the Hughes River. That the wild turkey management program be accelerated to develop a flock that would attract hunters during the spring and autumn hunting seasons. That the restrictions on deer hunting be liberalized to permit the harvest of does when conditions warrant. (Author)

PB-170 224 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Herkenhoff (Gordon) and Associates, Albuquerque, N. Mex.
RECREATION FACILITIES FOR NAVAJO RESERVOIR.
Engineers Preliminary rept.
1963, 111p
Contract Cc-6097

Descriptors: (*Economics, New Mexico), (*New Mexico, Economics), (*Recreation, New Mexico), Dams, Transportation, Costs, Oklahoma, Indiana, West Virginia, Neveda, Arizona, Population, Education.

Identifiers: Area redevelopment, Reservoirs, Tourist industry, Recreation facilities.

Conclusions: The Navajo Reservoir Recreation Area has great recreation potential and will fulfill a great present and expanding future need. The local economy will be materially benefitted by construction of recreation facilities. Considerable development can be financed by the issuance of revenue bonds to be retired from revenue produced. (Author)

PB-170 225 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Little (Arthur D.), Inc., San Francisco, Calif.
MONUMENT LAKE RECREATION AREA DEVELOPMENT PLAN.
Economic and engineering feasibility study.
Feb 65, 63p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Colorado), (*Colorado, Economics), (*Recreation, Colorado), Lakes, Skis, Costs, Housing, Employment, Water supplies, Sewage, Transportation, Roads, Pavements.

Identifiers: Area redevelopment, Recreation facilities, Tourist industry.

The study is concerned primarily with the engineering costs and economic feasibility of a proposed lodge and complex of cabins at Monument Lake, Colorado. The development was assumed to be 50% occupied during the winter months, the reality of which assumption depends on the development of an adjacent ski facility. The success of the development depends on the ski facilities and the paving and all-weathering of access roads. Should both these projects be fulfilled, the project is economically feasible because the average annual rate of return is almost 8% and because the cash return over the project's life is more than twice the total investment. (Author)

PB-170 226 **Field 5C, 8I, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Arkansas Geological Commission, Little Rock.
CORE DRILLING PROJECT PEYTON CREEK PHOSPHATE AREA ARKANSAS.
Final rept., Phase 2,
by Norman F. Williams. 15 Jan 65, 35p
Contract Cc-6098

Descriptors: (*Economics, Arkansas), (*Arkansas, Phosphates), (*Geophysical prospecting, Arkansas), (*Phosphates, Arkansas), Minerals, Well logging, Drilling, Stratigraphy, Mining engineering, Abundance, Industries.

Identifiers: Area redevelopment.

Drilling and other testing established the limits of the phosphate deposit being investigated. Ore reserve estimates were made using the phosphate isopachs shown on the map and the average-end-area method of computation. A minimum thickness of five feet and an average grade of 19 percent P2O5 was established for the estimate. A unit weight of 192 pounds/cu. ft. was computed for the phosphate rock by determining the specific gravity of the core from Hole S-6. Utilizing the above factors the Ferguson deposit contains 2,800,000 short tons of phosphate rock averaging 19 percent P2O5 and occurring in a bed five feet or greater in thickness. It should be noted that this is a gross tonnage figure and makes no allowance for mining losses. The reserves present in the subject deposit are not adequate to justify the further consideration of Mississippi Chemical Company for a plant of the size they projected in their original discussions. The Peyton Creek Phosphate Mining Company is currently producing some rock from this deposit and fine grinding it so that it can be sold for application as raw rock phosphate for appropriate agricultural purposes. The potential for an operation of this type can not be accurately established at this time since certain market and transportation considerations have not been completely explored. It is possible that a small but continuing and profitable operation of this type can be supported by the market and raw material presently known to be available.

PB-170 262 **Field 5C, 8F, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
INDUSTRIAL SITE SURVEY OF CARROLL COUNTY, GEORGIA,
by George I. Whitlatch, and Wallace B. Bishop, Jr. Jun 62, 78p Technical rept. TR-1
Proj. GIT-A-619
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. See also PB-170 526.

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Site selection, Industrial plants), Terrain, Civil engineering, Maps, Aerial photographs.

Identifiers: Area redevelopment.

A survey was made of the several Carroll County municipalities to determine their local site situations, to appraise their respective future industrial potentials, and to make any possible recommendations that may tend to enhance those potentials. The cities included in this survey are Carrollton, Villa Rica, Temple, Bowdon, Mount Zion, Roopville, and Whitesburg. The unincorporated village of Bowdon Junction also was surveyed. Selection of site areas for inspection was based largely upon map studies.

PB-170 267 **Field 5C, 2F, 11L, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Macdonald Associates, Inc., Washington, D. C.
KENTUCKY FOREST INDUSTRY FEASIBILITY STUDY.
Phase 2 rept.
11 Jun 62, 110p
Contract Cc-5888

Descriptors: (*Economics, Kentucky), (*Kentucky, Industries), (*Forestry, Kentucky), (*Wood, Kentucky), Trees, Natural resources, Commerce, Employment, Transportation, Power supplies, Feasibility studies, Labor.

Identifiers: Area redevelopment, Wood industry.

Contents: Section I - Forest land, Commercial timber, Economic factors, Transportation and communications, Area redevelopment programs, Section II - Wood Industry, Section III - Markets for Kentucky forest products, Section IV - Kentucky Forest Industries Corporation, Section V - Phase III study recommendations.

PB-170 269 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Candeub, Cabot and Associates, Scranton, Pa.
RECREATION PLAN - STAGE I. DEVELOPMENT PLAN FOR MAUCH CHUNK CREEK WATERSHED AREA CARBON COUNTY, PENNSYLVANIA,
by Roland Zunde. 30 Jul 65, 44p

Descriptors: (*Economics, Pennsylvania) (*Pennsylvania, Economics), (*Recreation, Economics), Costs, Water supplies, Sewage, Sanitary engineering, Rivers, Roads.

Identifiers: Area redevelopment, Recreation Facilities, Reservoirs.

This report represents the first stage in the development program for the Mauch Chunk Creek Watershed recreation facilities. It consists of site plans for the various elements recommended for the recreation complex. These plans include the delineation of the recreation areas, their location with regard to one another and their location with respect to their service functions. Major recreational facilities proposed for the first stage of development include a picnic area, beach and swimming area, organized game area, boating area, and tent and trailer camp site areas. Supplementing these recreational facilities are parking facilities, access drives, water and sanitary facilities shelter house, entrance building, trails, signs and markers. The plans that are included in this report represent the coordinated thinking of the various agencies concerned with the development of recreation facilities in the Mauch Chunk Creek Area. The progress toward actual construction of the facilities appears good with Congressional Approval of the overall project anticiparte in 1965 and construction of recreation facilities starting in 1967.

PB-170 289 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Technical Planning Associates, Inc., New Haven, Conn.

REPORT ON THE PROPOSED ACADIA RESORT DEVELOPMENT AT MILBRIDGE, WASHINGTON COUNTY AND TUNK LAKE, HANCOCK COUNTY MAINE.
Sep 65, 127p
Contract C-103-65

Descriptors: (*Economics, Maine), (*Maine, Economics), (*Recreation, Economics), Feasibility studies, Traffic, Climatology, Population, Employment, Natural resources, Lakes, Costs, Roads, Tidewater, Seacoast, Boats.

Identifiers: Area Redevelopment, Recreation facilities, Tourist industry.

Both parts of the proposed Acadia projects would be feasible if reduced in scale and if designed for economical construction and operation. We suggest that the shore resort be reduced in size to 100 rooms, consisting of uniform room-and-bath units to be combined in groups in a variety of site patterns, oriented for maximum privacy and outlook. This would be essentially a motel-type development, but in a flexible pattern. It would have restaurant and lounge space, swimming pool, tennis courts and similar recreation facilities. However, we feel that a golf course should be located elsewhere, to serve the entire community. This revised plan is estimated to reduce the investment to about 1.1 million dollars. This part of the project could operate about four months a year, and should have a gross income of about $440,000. At the Tunk Lake project we propose to eliminate consideration of a winter season, at least until the project is well established. We suggest retaining the 100 room size, but by eliminating the ski area and skating rink and by simplifying the plans, the investment could be kept to an estimated 1.2 million dollars. This part of the project, as modified, could operate for a season of about 5 to 5 1/2 months and should have a gross income of about $480,000. Various other projects are recommended to be undertaken by the West Washington Development Corporation, or some other community organizations. A program for action is suggested for the State, the West Washington Development Corporation and by the local towns. (Author)

PB-170 294 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Development Counsellors International, Ltd., New York.
SURVEY OF TOURISM IN THE STATE OF RHODE ISLAND (INCLUDING A SPECIAL REPORT ON BLOCK ISLAND).
1964, 120p
Contract C-68-65

Descriptors: (*Economics, Rhode Island), (*Road island, Economics), (*Recreation, Economics), Employment, Climatology, Roads, Management engineering, Transportation, Costs, Boats, Fishes, Beaches.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities, Marinas, Ports.

The survey was programmed to determine and define the existing and projected tourism potential; to recommend immediate action programs; to suggest changes and improvements in existing facilities; determine the need for, size, location, design, cost and feasibility of new facilities; and to create a program to develop year 'round business. Rhode Island's physical tourism plant (for the accommodation of visitors) is generally outdated and there is ample room for new accommodations and attractions. The State has good tourist attractions but they are in need of repair, refreshment in appearance and dramatization in presentation. Tourism presents the promise of a sound basic factor in the state's economic future. Substantial year 'round business can and will be developed. Development of tourism business will have a substantial and progressively favorable effect on employment.

PB-170 304 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Corplan Associates, Chicago, Ill.
ECONOMIC EVALUATION OF TOURISM AND RECREATION POTENTIAL OF PORTIONS OF FLAT- HEAD AND LAKE COUNTIES, MONTANA. VOLUME TWO.
Final rept.
Feb 66, 59p
Contract EDA-C-332-65,
Proj. 774

Descriptors: (*Economics, Montana), (*Montana, Economics), (*Recreation, Economics), Feasibility studies, Natural resources, Roads, Traffic, Commerce, Employment, Lakes, Harbors, Piers, Bays, Climatology, Mountains, Costs.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

II. Conclusions and recommendations: (I) Expansion of tourism-recreation in Kalispell, Whitefish, and Bigfork is feasible. The quantitative and qualitative factors evaluated in the feasibility study indicate that the interested parties in Kalispell, Whitefish, and Bigfork should begin planning immediately to expand the tourism-recreation industry in the area. (II) Three major facilities should be developed in the area surrounding Bigfork initially. Current tourist traffic volume and tourist expenditures warrant the immediate development of three major facilities in the Bigfork area; (A) A new summer playhouse at Bigfork, (B) A harbor at Bigfork, (C) Campsite facilities. In addition, the following areas should be developed; (D) Encourage boating and water sports at Bigfork, (E) Attract tourists from Glacier National Park, (F) Establish sightseeing excursions on Flathead Lake. (III) Tourists must be made aware of facilities. (IV) Implementation of tourism-recreation should be handled by a management committee. Details of the management plan are covered in Chapter Five of the report.

PB-170 305 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Corplan Associates, Chicago, Ill.
ECONOMIC EVALUATION OF TOURISM AND RECREATION POTENTIAL OF PORTIONS OF FLATHEAD AND LAKE COUNTIES, MONTANA. VOLUME THREE.
Final rept.
Feb 66, 34p
Contract EDA-C-332-65,
Proj. 774

Descriptors: (*Economics, Montana), (*Montana, Economics), (*Recreation, Economics), Natural resources, Feasibility studies, Roads, Employment, Traffic, Lakes, Commerce.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

Conclusions and recommendations: (I) Expansion of major tourism-recreation in the rollins-Somers area should be postponed until a later date. Present and, more important, potential tourist traffic volume indicates that the development of this property would be feasible in about five to ten years. Overall development is not recommended at this time because there are many existing facilities in nearby areas that are sufficient to accommodate tourists for the present. (II) Two campsites should be developed immediately. Current tourist traffic volume and the increasing use of camper units warrant the immediate development of two campsites, one at Rollins and the other at Somers. (III) Tourists must be made aware of facilities. (IV) Future development of additional tourist facilities is feasible.

PB-170 309 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Corplan Associates, Chicago, Ill.
ECONOMIC POTENTIAL FOR TOURISM AND RECREATION IN DEER LODGE AND SILVER BOW COUNTIES, MONTANA.
Final rept.
Mar 66, 107p
Contract C-332-65 (NEG),
Projs. 816, Q-6022-Q02
Availability: Original document in color until exhausted.

Descriptors: (*Economics, Montana), (*Montana, Economics), (*Recreation, Economics), Feasibility studies, Roads, Mining engineering, Natural resources, Commerce, Lakes, Traffic, Employment.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities.

Conclusions and recommendations: (I) Development of tourism-recreation in the Butte-Anaconda area is warranted. Interested parties should begin planning immediately to develop a tourism-recreation industry. Development of tourism and recreation will provide income and employment for the residents of Butte and Anaconda. (II) Four major tourist attractions should be given immediate attention. (A) Combine Butte and Anaconda into a single tourist center. (B) Develop a mining theme in Butte. (C) Develop an outdoor theme in Anaconda. (D) Construct campsite facilities. (III) Tourists must be made aware of facilities. (IV) Implementation of tourism-recreation should be handled by a management committee. Details of the management plan are covered in Chapter Five.

PB-170 341 **Field 5C, 8F**
CFSTI Prices: HC$7.00 MF$1.75
Checchi and Co., Washington, D. C.
THE ECONOMIC POTENTIALS OF TOURISM AND RECREATION IN SOUTHERN ILLINOIS.
Feb 66, 342p

Descriptors: (*Economics, Illinois), (*Illinois, Economics), (*Recreation, Economics), Feasibility studies, Natural resources, Lakes, Commerce, Fishes, Mining engineering, Roads, Boats, Water supplies, Employment, Costs, History, Piers.

Identifiers: Area redevelopment, Tourist industry, Recreation facilities, Marina.

Recommended Projects and Facilities: (A) The development of six tourism projects as follows: (1) Lodge at Devils Kitchen, (2) Giant City Convention Center, (3) Civil War Village, (4) White Cove, (5) Carlyle Marina, (6) Carlyle Village. These projects were selected because they represent the type of projects and facilities that could be successfully developed throughout the study area, in existing and potential growth centers, and on public and private land. Detailed cost data included in the report show that these projects will be self-liquidating. (B) In addition to these projects, the report recommends the early development of six recreation core areas and a recreation corridor running through the Shawnee Hills. Potentially this 'corridor' (combined with associated projects) would be the area's greatest tourism-recreation attraction. (C) Finally, the report developed a system of 'reserves'. These reserves include all the other projects and facilities needed during the next ten years if the tourism-recreation potentials of the area are to be developed. These projects are placed in three kinds of reserves: (1) a tourism reserve, (2) a recreation reserve, and (3) a reserve of public works needed to develop tourism and recreation.

PB-170 522 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Community Planning Services, Inc., Monroeville, Pa.
THE PRINCE GALLITZIN REGION: A GENERAL DEVELOPMENT PLAN,
by Daniel W. Moore. Dec 63, 66p
Availability: Original document in color until exhausted. Prepared in cooperation with Area Rede-

velopment Agency, Washington, D. C. Rept. on Prince Gallitzin Regional Plan. See also PB-170 052.

Descriptors: (*Economics, *Pennsylvania), (*Pennsylvania, Economics), (*Recreation, Economics), Population, Transportation, Coal, Mining, Housing, Employment, Roads.

Identifiers: Area redevelopment, Motels, Recreation facilities, Tourist industry.

The Regional Plan is based upon a study of the five township area (townships of Chest, Clearfield, Dean, Reade and white of Cambria County, Pennsylvania) as it now exists. The first step was the preparation of base maps of each township at the scale of one thousand feet to the inch. Maps of the entire region were made at 2,000' scale. The population trends in the area were noted and other considerations such as major employment and quality of roads were investigated. After the mapping and analysis of existing conditions was complete, the actual long-range plans were developed. The last and most important part of this study is the plans for effectuation of the Regional Plan. How to implement realistic and workable zoning, land subdivision and building codes should be a major concern. How to set up methods for achieving close coordination of road improvement plans and plans for utilities and public facilities are of vital importance. A final section of the report deals with the important subject of public relations, both to help keep local citizens informed, and to promote the use of the Region's facilities.

PB-170 525 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
PROCEDURES FOR PROMOTING INDUSTRIAL DEVELOPMENT IN CARROLL COUNTY, GEORGIA,
by George I. Whitlatch. Jan 63, 20p
Memorandum rept. no. MR-2
Proj. GIT-A-619
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. See also PB-170 526.

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Industries, Georgia), Industrial relations, Site selection, Industrial plants, Instruction manuals, Water supplies, Building, Power supplies, Labor, Costs, Management engineering.

Identifiers: Area redevelopment.

The report outlines the principal steps the Chamber's industrial developer should follow in meeting the demands of his work. The suggested procedures range from the initial activities of data assembly and methods of presentation to ways and means of generating prospects.

PB-170 526 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
RECOMMENDATIONS OF GEORGIA TECH FOR THE PROMOTION OF INDUSTRIAL DEVELOPMENT IN CARROLL COUNTY, GEORGIA,
by George I. Whitlatch. Jan 63, 7p Memorandum rept. no. MR-1
Proj. GIT-A-619
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. See also PB-170 525.

Descriptors: (*Economics, Georgia), (*Georgia, Industries), (*Industries, Georgia), Industrial relations, Site selection, Industrial plants, Urban planning, Management engineering, Instruction manuals.

Identifiers: Area redevelopment.

Since Carrollton is the only city of sufficient size in Carroll County to support a full-time Chamber of Commerce operation, it is recommended that the present operation be expanded to a countywide organization. To provide for the proper presentation of Carroll County's industrial advantages to prospects and to make any necessary preliminary commitments on sites, financing or other aspects of a project, it is proposed that this function be delegated to the Industrial Commitee of the Chamber of Commerce. Since a countywide promotional operation will involve not only the Chamber of Commerce, but also at least three other organizations--the Carroll County Development Corporation, the Carrollton Payroll Development Authority, and the Carroll County Redevelopment Committee--there is the obvious necessity for close cooperation and understanding among all four groups.

PB-170 527 **Field 5C, 13H, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Rock (William P.) and Associates, Little Rock, Ark.
REPRODUCTIONS OF WOOD MOTIVES IN STONE COUNTY, ARKANSAS: A FEASIBILITY REPORT.
16 Apr 65, 18p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Arkansas), (*Arkansas, Industries), (*Industries, Arkansas), Commerce, Costs, Management engineering, Ceramic materials, Molding, Feasibility studies, Labor.

Identifiers: Area redevelopment, Arts and Crafts.

The establishment and operation of a small shop in Stone County, Arkansas, for the reproduction of wood motives in Plaster of Paris is feasible. The choice of Plaster of Paris for reproductions offers advantages over other materials: The original investment is small. Skills can be acquired by local persons within a short time at reasonable cost and with a modicum of supervision. Initial operations do not require the full time attention of the person (s) performing the work, and may be handled by persons with other (prime or supplementary) employment. A market can be attained which can be served without unusual investments in time, development cost, or accounts receivable financing. Reproductions, though limited in size, can easibly be: figurines, bookends, decorative articles, wall placards, etc., assuring flexibility in marketing and easy adjustments to rapidly changing market preferences and fads. Articles sold promise a satisfactory profit margin, do not need to be produced for inventory (short manufacturing cycle), nor do they require costly materials. Expansion of production and/or employment can be achieved gradually, with added cost limited to training in the first stages. (Author)

AD-632 993 **See Field 5A**

AD-633 008 **See Field 12B**

AD-633 338 **See Field 5A**

5D. HISTORY, LAW, AND POLITICAL SCIENCE

AD-632 815 **Field 5D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
FROM NATO TO INDEPENDENCE: REFLECTIONS ON DE GAULLE'S SECESSION,
by Horst Mendershausen. Mar 66, 33p P-3334
Prepared for presentation at a seminar at the Washington Center of Foreign Policy Research, Washington, D. C.

Descriptors: (*France, *Foreign policy), United States Government, West Germany, USSR, Europe, History.

Identifiers: NATO, De Gaulle.

In the short term, France's secession from NATO suggests a tactical success for de Gaulle and promises an uncomfortable though probably peaceful adaptation of relations in the European area to a loosening of international obligations and a lessening of the 'unity of purpose.' The response of the alliance suggests that its political and military substance is more destructible than its appearances. But while de Gaulle may succeed in destroying the substance of NATO, he will probably fail to gain a strategic victory for France, for by asserting France's independence from the United States, he is likely to open the way to Germany's independence from France.

AD-633 053 **Field 5D**
CFSTI Prices: HC$3.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SOVIET POLICY IN LATIN AMERICA,
by Herbert S. Dinerstein. May 66, 53p RM-4967-PR
Contract AF 49 (638)-1700

Descriptors: (*USSR, Foreign policy), (*Latin American, *Communism), Government (Foreign), Political science, Cold war, Cuba, Central America, South America.

Identifiers: Underdeveloped countries.

An examination of Soviet policy for the last ten years in underdeveloped countries in general and in Latin America in particular. Two factors have motivated the Soviet Union to modify its traditional attitude toward the transition to communism in underdeveloped countries: (1) Soviet leaders have accepted the idea of peaceful transition to socialism on the assumption that it will eventually become communism; and (2) the Cuban revolution and its aftermath have shown that traditional methods are not necessarily viable models for the present. Soviet foreign policy objectives in Latin America now appear more limited and realistic than in the period before the missile crisis; current efforts are directed toward strengthening Latin American nationalism. (Author)

AD-633 188 **Field 5D, 8F**
CFSTI Prices: HC$7.85 MF$2.25
Utah Univ., Salt Lake City.
WESTWARD VIA NICARAGUA: THE UNITED STATES AND THE NICARAGUA ROUTE, 1826-1869.
Doctoral thesis,
by David Izatt Folkman Jr. Jun 66, 485p
Contract AF 33 (608)-1288

Descriptors: (*Nicaragua, *Inland waterways), (*History, United States), (*Foreign policy, United States Government), Geography, Economics, Transportation, Water traffic, Central America.

The great exodus to the west following the discovery of gold in 1848 has attracted the attention of numerous western historians. Much has been written about the overland journey, the voyage around Cape Horn, and travel by the Isthmus of Panama. Considerable attention has also been paid to the dispute with Great Britain over her position in Central America and to the activities of the filibuster William Walker. In all of this literature, notwithstanding the many references to the subject, the full story of the Nicaragua route has never been told. The purpose of this work is to attempt to show the part that the transit played in the westward movement of the United States. In doing this, attention will be focused on the growth of an isthmian policy and the capitalistic struggle for control of the route. (Author)

AD-633 202 **Field 5D**
CFSTI Prices: HC$4.00 MF$0.75
Syracuse Univ., N. Y.
CZECHOSLOVAK-RUSSIAN RAPPROCHEMENT 1938 - 1945.

Master's thesis,
by Donald Woodman Swain. May 66, 104p
Contract AF 33 (608)-1280

Descriptors: (*Czechoslovakia, Foreign policy), (*USSR, Foreign policy), (*History, Europe), Political Science, Geography.

The growing rapprochement between Czechoslovakia and the Soviet Union, from 1938 until June 1945, and the factors that motivated their interrelations, constitute the subject of this thesis. The desired goal is not only to describe the process by which the two nations drew closer to each other, but so far as possible to explain the motivations which underlay their actions. (Author)

AD-619 543 See Field 15D

AD-632 863 See Field 15C

AD-632 993 See Field 5A

AD-633 149 See Field 5K

AD-633 190 See Field 5I

AD-633 270 See Field 15F

AD-633 336 See Field 5A

AD-633 338 See Field 5A

PB-169 885 See Field 5C

5E. HUMAN FACTORS ENGINEERING

N66-18161 **Field 5E**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
RESEARCH ON USE OF COMPUTERS FOR HANDLING ADVANCED SYSTEMS HUMAN FACTORS TASK DATA.
Quarterly status rept. 1 Oct-31 Dec 65,
by L. E. Reed. 18 Feb 66, 6p
Contract NASA Order-R-115
NASA CR-70513

Descriptors: *Human factor, *Computer method, *Systems analysis.

AD-632 913 See Field 6J

AD-633 055 See Field 5H

AD-633 106 See Field 1D

AD-633 206 See Field 5A

AD-633 233 See Field 13A

AD-633 250 See Field 6E

5G. LINGUISTICS

AD-632 916 **Field 5G, 5I**
CFSTI Prices: HC$3.00 MF$0.75
Institute for Defense Analyses, Arlington, Va. Research and Engineering Support Div.
FOREIGN LANGUAGE TRAINING: AN INVESTIGATION OF RESEARCH AND DEVELOPMENT FOR VIETNAM,
by H. Wallace Sinaiko. Mar 66, 98p Study-S-232, IDA/HQ-66-4476
Contract SD-50

Descriptors: (*Language, Training), (*Vietnam, Language), Military personnel, English language, Teaching methods, France, Linguistics, Programmed instruction.

The report describes foreign language requirements for U. S. military personnel going to Viet Nam and research to improve language training. The report examines the nature of the language problem in Viet Nam, the type of training now given in Vietnamese and research results on language training generally that might be applied to the present situation. A recently developed experimental course in Vietnamese is investigated, including a follow-up in Viet Nam of people who had taken the course. Two general types of remedial action are proposed: administrative or policy actions not involving research, and the initiation of new research projects that would be in direct support of Vietnamese language requirements. (Author)

AD-633 350 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.75
University Coll., London (England). Phonetics Lab.
PROGRESS REPORT,
by A. J. Fourcin. Sep 65, 77p
Contract AF 61 (052)-692
AFCRL 66-169
See also AD-430 704.

Descriptors: (*Linguistics, Scientific research), (*Speech, Scientific research), Speech representation, English language, German language, Sound pitch, Pitch discrimination, Spectrum analyzers, Feedback, Vietnam, Language, Sound reproduction systems.

Identifiers: Vowels.

Contents: Duration and spectral form as cues in the recognition of English and German vowels; perception of time intervals; pitch mediation by temporal mechanisms; experiments with delayed auditory feedback; formants in Vietnamese vowels of different tones; measurement of trans-glottal impedance; fricative synthesis with an acoustic model; spectral analysis; direct random recording of synthetic speech stimuli; automatic audiometer; dependence of stress judgments on vowel formant structure.

AD-633 395 **Field 5G**
Ohio State Univ. Research Foundation, Columbus.
A STUDY OF NONSENSE SYLLABLES SPOKEN BY TWO LANGUAGE GROUPS IN VARYING CONDITIONS OF SIDETONE AND READING RATE,
by Sadanand Singh, and John W. Black. 1965, 8p
Rept. no. 105
Contract Nonr-495 (18), Grant NIH-NB-03388,
Projs. NR-145-993, RF-1002

Descriptors: (*Phonetics, *Speech), English language, Analysis of variance, Reading, Velocity, Language, Interference, Sound, Noise.

Identifiers: Hindi.

Twenty-eight experimental subjects, 14 English-speaking and 14 Hindi-speaking, were assigned to record an equal number of paired nonsense syllables under two conditions of three variables: (1) delayed and normal sidetone, (2) noisy and quiet conditions of listening, and (3) fast and normal rates of speaking. The results show that the two language groups did not differ statistically significantly in the mean duration of the syllables nor in mean syllabic speech power. The duration of speech was universally lengthened under the condition of delayed sidetone, as compared to the normal. The duration was also longer under the condition of normal rate of reading as compared to the fast. Both delayed sidetone and noise in the earphones increased the mean syllabic speech power of the speakers. Presumably the noise reduced the talkers' awareness of the delayed sidetone. Although delayed sidetone increased the number of phonetic errors as compared to the normal sidetone for all, the two language groups differed significantly in scores that were derived from the phonetic transcriptions of recorded verbal material. (Author)

5H. MAN-MACHINE RELATIONS

AD-633 055 **Field 5H, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Mitre Corp., Bedford, Mass.
STUDIES IN DISPLAY SYMBOL LEGIBILITY, PART VIII: LEGIBILITY OF COMMON FIVE-LETTER WORDS,
by Gary Kosmider, Marion Young, and Glen Kinney. May 66. 17p TM-4239-Pt-8
Contract AF 19 (628)-5165,
Proj. AF-7030
ESD TR-65-385

Descriptors: (*Language, Effectiveness), (*Display systems, Human engineering), Psychometrics, Visual perception, Reading, Man-machine systems, Brightness.

Identifiers: Words, Legibility.

The report describes the findings of a study in symbol legibility which investigated the reading time and errors for common five-letter words when they are projected by a solid stroke and when they are shown by a broken stroke. The latter was produced on a 945-line T monitor at 10, 7, and 5 active lines per symbol height. With visual size, brightness, contrast, and other viewing conditions controlled, the best reading performance resulted from solid-stroke letters. Broken-stroke letters constructed by resolution of 10, 7, and 5 lines resulted in progressively poorer performances. (Author)

AD-633 003 See Field 9B

AD-633 269 See Field 1D

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

AD-632 741 **Field 5I, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
PROGRAM SCREEN: MANUAL FOR USE OF COMPUTER IN ENLISTED CLASSIFICATION PROJECT COMPASS, PART II.
Technical bull.,
by Bruce R. Wood, Carl C. Schuster, andJohn D. Martin. Apr 66, 27p STB-66-29
Proj. PF016050201
See also AD-631 505.

Descriptors: (*Programming (Computers), Personnel management), (*Personnel management, Data processing systems), (*Naval personnel, Selection), Classification, Education, Instruction manuals, Job analysis, Psychometrics, Errors.

Identifiers: SCREEN Program, COMPASS Project, PROFILE Program.

This report describes the operation and use of Program SCREEN, the second part of Project COMPASS, a computer assisted classification and assignment system. Program SCREEN, a FORTRAN computer program, reviews a Navy recruits eligibility for entrance into the various naval schools for which he may have been recommended by an Enlisted Classification Interviewer. It then prints out all errors in such recommendations, thus allowing changes to be made before the assignment process actually takes place. (Author)

AD-632 943 **Field 5I**
CFSTI Prices: HC$6.00 MF$1.50
System Research Ltd., Richmond (England).
RESEARCH ON THE DESIGN OF ADAPTIVE TEACHING SYSTEMS WITH A CAPABILITY FOR SELECTING AND ALTERING CRITERIA FOR ADAPTATION.

Annual summary rept. no. 4, 1 Apr 63-31 Mar 64,
by Gordon Pask. 30 Apr 64, 305p
Contract AF 61 (052)-402
See also AD-633 001.

Descriptors: (*Teaching machines, Design), Cybernetics, Teaching methods, Man-machine systems, Learning, Training, Reaction (Psychology), Reflexes, Great Britain.

Part 1 opens with a brief resume of the dynamic and structural assumptions underlying the cybernetic model, and it continues with a survey of the conditions that need to be satisfied in order to design (rather than 'intuit') a machine capable of maintaining stable interaction with a human operator. The remainder is concerned with describing and interpreting the experiments actually conducted. Part 2 considers the implications of these findings in greater detail, and with special reference to the problem of designing a practicable group tuition system. Because of the need for dynamic interaction, special emphasis is given to the possibility of devising a group system in which students and teachers alike can all be provided with this facility in controlled form. (Author)

AD-632 944 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
System Research, Ltd., Richmond (England).
AN ADAPTIVE AUTOMATION FOR TEACHING SMALL GROUPS,
by G. Pask, and B. N. Lewis. 1961, 14p
Contract AF 61 (052)-402

Descriptors: (*Teaching machines, Group dynamics), (*Group dynamics, Teaching methods), (*Teaching methods, Teaching machines), Social communication, Cybernetics, Learning, Feasibility studies, Great Britain, Automata.

It was first argued that the automated teaching of small groups requires, for most skills, a rather special kind of adaptive automation which can organise the group members by manipulating their channels of communication. An example of such an automaton was then described and its potentialities pointed out. (Author)

AD-633 000 **Field 5I**
CFSTI Prices: HC$14.60 MF$1.00
System Research, Ltd., Richmond (England).
RESEARCH ON THE DESIGN OF ADAPTIVE TEACHING SYSTEMS WITH A CAPABILITY FOR SELECTING AND ALTERING CRITERIA FOR ADAPTATION.
Annual technical summary rept. no. 2, 1 Apr 61-31 Mar 62,
by Gordon Pask. 30 Apr 62, 142p
Contract AF 61 (052)-402
See also AD-262 972.

Descriptors: (*Teaching machines, Design), (*Teaching methods, Theory), Group dynamics, Training, Cybernetics, Learning, Decision making, Social communication, Great Britain.

Topics include: the distribution of control in decision-making groups, interaction between a group of subjects and an adaptive automaton to produce a self-organising system for decision-making, review of experimental procedure, comments on an indeterminacy that characterises a self-organising system, strategies of communication, a simple adaptive teaching machine. (Author)

AD-633 001 **Field 5I**
CFSTI Prices: HC$9.60 MF$0.75
System Research, Ltd., Richmond (England).
RESEARCH ON THE DESIGN OF ADAPTIVE TEACHING SYSTEMS WITH A CAPABILITY FOR SELECTING AND ALTERING CRITERIA FOR ADAPTATION.
Annual technical summary rept. no. 3, 1 Apr 62-31 Mar 63,
by Gordon Pask. 30 Apr 63, 99p
Contract AF 61 (052)-402

See also AD-633 000.

Descriptors: (*Teaching machines, Design), (*Teaching methods, Theory), Learning, Cybernetics, Analysis, Great Britain, Group dynamics.

Part 1 describes some results obtained from the further analysis of data from the adaptively stabilized group instruction system that suggests a number of algorithms for the control of group teaching systems whether or not they are adaptively stabilized. Part II describes the background philosophy of the individual adaptive teaching systems. A pair of systems are considered in detail. One of these was realized as a physical device and is in use. The other has been built but its design is being modified. Finally there is a brief discussion of the research in progress, using these machines, and of various hypotheses that have been advanced concerning the structure of different skills and its influence upon their acquisition. (Author)

AD-633 059 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Cincinnati Univ., Ohio.
THE EFFECTS OF SIMILARITY AND REPETITION OF RESPONSE ALTERNATIVES ON VARIOUS TYPES OF PAIRED ASSOCIATE LEARNING.
Final rept.,
by K. A. Johnson, R. J. Senter, and F. W. Smith. Dec 65, 25p
Contract AF 33 (615)-1046,
Proj. AF-1710,
Task 171007
AMRL TR-65-214

Descriptors: (*Learning, *Teaching methods), Psychometrics, Training, Performance tests, Recall, Verbal behavior.

The investigation was an attempt to find learning materials for which the simultaneous presentation technique would be inferior to other techniques. Subjects learned a 40-item list of paired-associates under one of four training conditions. The stimulus terms were the names of electronic circuits, the response terms, schematic diagrams of electronic circuits. Half the items had distractors that were very similar to the correct response term, the remaining half, distractors that were less similar. Half the items in each of these groups had distractors that were the correct response terms for other items in the list. The remaining items had distractors that were unique to a given item. The overall differences between training techniques were not large, but there was some indication that the Five Alternative Prompt condition was inferior to the remaining conditions. Interactions were found between training conditions and item types, but again the differences involved were not large. Separate comparisons on the various item types indicated that in no case was the One Alternative Prompt condition reliably inferior to any of the remaining conditions. (Author)

AD-633 165 **Field 5I**
CFSTI Prices: HC$2.60 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
COURSE ACHIEVEMENT OF STUDENTS WITH UNSATISFACTORY ACADEMIC AVERAGES IN BASIC ELECTRONICS.
Staff memo.,
by Harry E. Anderson Jr., and James E. Whipple. Sep 68, 26p
Task RADAR-9

Descriptors: (*Electronics, Army Training), (*Army training, Psychometrics), (*Achievement tests, Military requirements), Students, Aptitude tests, Education.

The study was conducted to investigate academic achievement of students in a fire control maintenance course. Four experimental classes, involving a total of 92 trainees, for whom complete data were available, were allowed to complete the course regardless of grades and without undergoing boarding action. This experimental procedure permitted analysis of grades throughout the course for each trainee. An electronics aptitude test was given to each trainee prior to the course. The study showed that a substantial number of students, normally removed from their class as a result of deficient grades in Basic Electronics, possessed the ability to make satisfactory grades in later phases of instruction on the equipment. The principal recommendation from the research is that the technique used can be utilized by training agencies to determine, objectively and scientifically, what grades during training will be optimal for passing, boarding, and failing. (Author)

AD-633 189 **Field 5I**
CFSTI Prices: HC$4.00 MF$0.75
George Washington Univ., Washington, D. C.
A COMPARATIVE STUDY OF HOSPITAL VOLUNTEER PROGRAMS IN SELECTED HOSPITALS IN BEXAR COUNTY, TEXAS,
by David U. Burke. Jun 66, 119p
Contract AF 33 (608)-1232

Descriptors: (*Medical personnel, Personnel management), (*Job analysis, Medical personnel), Hospitals, Labor, Texas.

The purpose of the report is to present the results of a comparative study of hospital volunteer programs in selected hospitals located in Bexar County, Texas. In addition, trends and patterns revealed by researching literature pertaining to hospital volunteer programs were related to the study in order to discover what similarities or differences exist. The study is limited to determining answers to the following questions: (1) Does hospital size, ownership, and type, or length of patient stay influence the extent of volunteer services provided. (2) How and to what extent do hospitals utilize volunteers. (3) How are volunteer programs organized. (4) Do programs with full-time, salaried directors operate differently from those with volunteer directors. (5) Who does volunteer work in the hospital.

AD-633 190 **Field 5I, 5D**
CFSTI Prices: HC$4.00 MF$0.75
George Washington Univ., Washington, D. C.
PATTERNS AND TRENDS OF CONTROLS GOVERNING THE PROFESSIONAL ACTS OF HOSPITAL NURSING PERSONNEL,
by Joseph A. Baird Jr. Apr 66, 127p
Contract AF 33 (608)-1232

Descriptors: (*Nurses, Personnel management), (*Job analysis, Nurses), Hospitals, Law, Control.

In order to control the scope of hospital nursing practice, six patterns of control have evolved: control by statutes, court interpretation of statutes, opinions of state attorneys general, state administrative boards, private organizations, and hospital policy-making bodies. The effectiveness of these controls and the legal limitations on nursing acts have varied from state to state. Some general nursing practice parameters have been set, but the lines have been poorly marked and there are still many gray areas in hospital nursing practice. This has led to trends to modify the controls to correct their weaknesses. These have simply been trends, so that in many situations nurses still do not know their legal limitations. The problem still exists. One solution in the form of a realistic formal plan is available to nurses if they will unite to install the plan to resolve scope of practice questions in each state as they arise. (Author)

AD-633 193 **Field 5I**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Univ., Amherst.

THE UNITED STATES AIR FORCE COMPANY-GRADE OFFICER EVALUATION SYSTEM: A STUDY OF PERFORMANCE APPRAISAL,
by Browning C. Wharton, Jr. 1966, 105p
Contract AF 33 (608)-1248

Descriptors: (*Officer personnel, Performance (Human)), (*Air force personnel, Performance (Human)), Analysis, Personnel management.

Identifiers: Evaluation.

The study suggests that the Air Force company grade officer evaluation system could be greatly improved if the appraisal tool were designed specifically for the position being rated, if performance and potential factors were clearly defined, if the coaching technique of counseling were made mandatory, and if exogenous influences were minimized.

AD-633 195 **Field 5I**
CFSTI Pries: HC$2.00 MF$0.50
Minnesota Univ., Minneapolis.
A STUDY OF PHYSICIAN TIME EXPENDED ON PATIENTS BEING EVALUATED FOR AIR FORCE RETENTION, SEPARATION OR RETIREMENT.
Master's thesis,
by Frank J. May, Jr. Mar 66, 51p
Contract AF 33 (608)-1253

Descriptors: (*Medical personnel, Time studies), (*Air force personnel, Medical examination), Selection, Personnel management, Decision making, Hospitals, Military medicine.

AD-633 197 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.75
Oklahoma Univ., Norman.
A NEW DIMENSION IN FEDERAL UNIONISM.
Master's thesis,
by Harold Robert Dimond Jr. 1966, 85p
Contract AF 33 (608)-1264

Descriptors: (*Labor unions, Government employees), (*United States Government, *Personnel management), (*Government employees, Personnel management), Labor, Bargaining, Law, Political science, Reviews.

The primary objective of the study is to present the cause, content and effect of Executive Order 10988 (Employee-Management Cooperation in the Federal Service). It attempts to provide a synthesis of the best analyses and interpretations of the Order. In addition, the report includes a condensed history of Federal unionism. Some questions to be considered include (1) What actions or events led to promulgation of the Order. (2) To what extent is collective bargaining functional in a sovereign government. (3) Will government employees accept this as an opportunity to unite for a common goal. (4) What implication does this potential membership hold for organized labor.

AD-633 258 **Field 5I, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
A COMPUTERIZED MODEL OF THE FLEET PERSONNEL DISTRIBUTION SYSTEM.
Research rept.,
by Robert P. Thorpe, and Richard D. Conner. Feb 66, 23p SRR-66-13
Proj. PF016080201

Descriptors: (*Naval personnel, Distribution), (*Personnel management, Automation), Computers, Simulation, Information retrieval.

Identifiers: Personnel screening tests.

The report describes the development and operational test of a computerized personnel distribution model designed to simulate the distribution functions of the Pacific Fleet Enlisted Personnel Distribution Office (EPDOPAC). This model consists of the Sort-Match model, which is designed to perform the function of screening personnel made available to the EPDO by BUPERS, and the Quota Determination model which equitably allocates to the type commands those personnel who are not assigned by the Sort-Match model. The report also describes other current research concerned with personnel assignment, prediction techniques, policy-testing techniques, and personnel rotation. Some description is also presented on long range research plans which include development of a completely integrated all-Navy Personnel Assignment, Distribution, and Rotation model (PADRO model), automation of certain other aspects of the distribution and assignment system, development of a fleet personnel data bank, and the design of an information retrieval model. (Author)

AD-633 410 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Army Personnel Research Office, Washington, D. C.
METHODS FOR IMPROVING ENLISTED INPUT--CURRENT RESEARCH ACTIVITIES.
Technical research rept.,
by A. G. Bayroff. Feb 66, 21p TRR-1144
Proj. DA-2J024701A722

Descriptors: (*Army personnel, Selection), (*Personnel management, Psychometrics), Recruiting, Aptitude tests.

Identifiers: Personnel screening tests.

In response to continuing requirements of the Deputy Chief of Staff for Personnel (DCSPER), Department of Army, the INPUT QUALITY Task directed its research efforts to developing new approaches to screening problems and to contributions of screening activities to classification and other manpower management functions. Successive forms of general military trainability measures--Armed Forces Qualification Test (AFQT) and Enlistment Screening Test (EST)--and supplementary measures of specific aptitudes (Army Qualification Battery, AQB)--were developed and produced to aid in more effectively determining enlistment eligibility. (Author)

PB-169 396 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
THE INNOVATIONAL MATRIX,
by John G. Caffrey. 23 Dec 65, 18p SP-2286

Descriptors: (*Education, Scientific research).

The process of innovation in education, as in any similar field, is probably as important as the specific results of attempts to innovate. From such experiments as SDC's Traveling Seminar, and from personal observation, one may generalize that innovations (improvements) are absorbed or accepted by educators when: There is urgent need to adapt to a new environment or new pressures; There is no strong tradition to counter (as in new schools or in the teaching of new subject matter), or where there is a tradition of innovation; There is extrinsic motivation (dollars or honors); There is strong pressure from revered or respected leadership; Old tools are taken away and new ones must be forged; There is freedom and intrinsic motivation to experiment; There are sufficient resources: materials, money, assistance, facilities, and especially time; Institutional membership is carefully cast to ensure the proper mix of innovators, facilitators, and acceptors (users); and The innovator is protected politically so that occasional mistakes or failures will not destroy his position. The leader in an effective innovative system is usually an adroit politician and must be able to balance social and intellectual forces properly. To ensure innovation which has widespread effects in practice, so-called 'centers' must be kept as near the scene of practice as possible. New institutional arrangements may have to be created to ensure this. (Author)

AD-632 916 **See Field 5G**

AD-632 996 **See Field 5J**

PB-169 898 **See Field 5C**

PB-170 059 **See Field 5C**

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-632 735 **Field 5J, 9D, 17B**
CFSTI Prices: HC$3.00 MF$0.75
Applied Psychological Services, Wayne, Pa.
STUDIES INTO INFORMATION PRESENTATION THROUGH NOVEL METHODS: INFORMATION TRANSFER THROUGH ELECTROCUTANEOUS STIMULATION.
Phase rept. no. 7,
by Arthur I. Siegel, Richard S. Lanterman, and Douglas H. Macpherson. 1966, 98p
Contract DA-28-043-AMC-00186 (E),
Proj. DA-1C0-24701-A-121,
Task 1C0-24701-A-121-03
ECOM 00186-7
See AD-434 452.

Descriptors: (*Information theory, *Sensory perception), (*Tracking, Information theory), Galvanic skin response, Visual signals, Vision, Reaction (Psychology), Auditory perception, Skin, Stimulation, Probability, Applied psychology, Decision making, Coding, Training, Auditory signals.

Identifiers: Electrocutaneous information transfer, Morse Code, Bayes' theorem.

International Morse code reception, one dimensional tracking, and probalistic decision making with electrocutaneous signals were investigated. It was found that trained Morse operators can receive electrocutaneously presented Morse code after only brief training. After as much as 19 to 22 hours of electrocutaneous Morse reception training, the operator's performance with electrocutaneous signals had not reached their performance levels with auditory signals. No difference was found between electrocutaneous and visual, one-dimensional tracking or between probalistic decision making with the two modes of reception. (Author)

AD-632 823 **Field 5J, 6E**
CFSTI Prices: HC$1.10 MF$0.50
Cambridge Univ. (England). Psychological Lab.
THE EFFECTS OF FRONTAL LESIONS AND NITROUS OXIDE ON THE TIMING BEHAVIOUR OF MONKEYS AND THE EFFECTS OF LIMITED LESIONS OF THE STRIATE CORTEX ON THE VISUAL BEHAVIOUR OF MONKEYS.
Annual summary rept. no. 1,
by Lawrence Weiskrantz. 31 Dec 59, 6p
Contract AF 61 (052)-185

Descriptors: (*Behavior, Monkeys), (*Visual acuity, Monkeys), Cerebral cortex, Nitrogen compounds, Oxides, Conditioned reflex, Sensory perception, Memory, Reaction (Psychology), Tranquilizers, Reserpine, Probability, Great Britain.

Identifiers: Lesions.

AD-632 854 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Kansas State Univ., Manhattan. Dept. of Psychology.
THE EVOLUTION OF PERCEPTUAL FRAMES OF REFERENCE.
Technical repts.,
by William Bevan, Lloyd Avant, H. G. Lankford, Harry Henson, and Henry Masters. 20 May 66, 96p TR-37, TR-38

Contract Nonr-3634 (01)
Includes Technical repts. 37-40.

Descriptors: (*Reaction (Psychology), Reflexes), (*Visual perception, Colors), (*Adjustment (Psychology), Decision making), (*Motivation, Adjustment (Psychology)), Perception (Psychology), Behavior.

Identifiers: Color coding.

Contents: Serial reaction time and the temporal pattern of prior signals; Color coding and the potency of anchors and residuals in the judgments of size; A quantitative study of relevance in the formation of adaptation levels; Some problems in motivation from the point of view of the theory of adaptation level.

AD-632 893 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Indiana Univ., Bloomington.
PHYSIOLOGICAL AND SUBJECTIVE ADAPTATION TO SHOCK: A DISCREPANCY.
Technical rept.,
by Robert M. Stern, and Larry Gaupp. May 66, 12p TR-12
Contract Nonr-908 (15)

Descriptors: (*Electric currents, Reaction (Psychology)), (*Adaptation (Physiology), Electric currents), (*Galvanic skin response, Adaptation (Physiology)), Tolerances (Physiology), Stress (Psychology), Autonomic nervous system, Central nervous system, Stimulation, Intensity, Analysis of variance, Psychophysiology.

The purpose of the experiment was to compare subjective and physiological adaptation to 15 repeated electric shocks of the same intensity. Twenty-four subjects received shocks at the highest level they would tolerate, 24 others received shocks at their predetermined 'annoying' level. All subjects were told that shock intensity would vary from trial to trial and that their task was to rate the intensity of each shock. The data for both groups show that there was no physiological adaptation, as determined by size of GSRs, but there was significant subjective adaptation. The results are accounted for in terms of special qualities of the stimulus -- electric shock. (Author)

AD-632 996 **Field 5J, 5I, 6S**
CFSTI Prices: HC$2.00 MF$0.50
Navy Medical Neuropsychiatric Research Unit., San Diego, Calif.
ADAPTATION TO EXTREME ENVIRONMENTS: PREDICTION OF PERFORMANCE.
Interim rept.,
by E. K. Eric Gunderson. Apr 66, 47p Rept. no. 66-17
NAVMED MF-022.0f.03-9001
See also AD-632 571.

Descriptors: (*Antarctic regions, Personnel), (*Adjustment (Psychology), Antarctic regions), Psychiatry, Performance (Human), Stress (Psychology), Selection, Personality, Job analysis, Emotions, Motivation, Psychometrics, Performance tests.

Identifiers: Personnel screening tests.

The report summarizes a series of studies concerned with environmental and psychological factors related to adjustment or performance in isolated Antarctic groups. These studies were designed to provide support for the Navy's psychiatric assessment program and to aid in selection of suitable military and civilian applicants for service at Antarctic scientific stations. Possible sources and effects of stress in this type of confined environment are considered. Methods developed for the measurement of individual and group performance are described, and results of studies conducted to evaluate the predictive validities of biographical, clinical, and personality data are presented in detail. Studies of emotional and motivational changes during the long Antarctic winter and the relationships of such changes to occupational and social roles, psychological needs, and effective work performance are reported. (Author)

AD-633 045 **Field 5J, 6H**
CFSTI Prices: HC$3.00 MF$0.75
Army Natick Labs., Mass. Pioneering Research Div.
FOOD ACCEPTANCE AND PREFERENCE RESEARCH: AN ANNOTATED BIBLIOGRAPHY.
Technical rept.,
by Barbara L. Bell, Naomi S. Oshinsky, and Joel-Wolfson. Jul 65, 65p TR-EPT-5

Descriptors: (*Food, Public opinion), (*Taste, Food), Smell, Thresholds (Physiology), Attitudes, Bibliographies, Odors, Psychophysiology.

The 293 items cited in this bibliography represent recent (1950 to 1964) contributions to the rapidly growing fields of food acceptance and preference research and related areas. There are 173 annotated entries. Most of these are items published in the scientific and technical journals of relevant subject areas -- food science and technology, psychology, and marketing research. The other 120 entries are reports published by several of the branches of the U.S. Government.

AD-633 077 **Field 5J**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
EXPERIMENTAL DESIGN FOR INVESTIGATING CONDITIONING,
by Norman B. Reilly. May 66, 27p P-3359

Descriptors: (*Conditioned reflex, Experimental design), Psychology.

The extent to which autogenous techniques may enable the conscious monitoring and/or control of processes normally considered involuntary is not known. However, such experimentation may discover ways to broaden the boundaries of human capability and, hopefully, suggest many practical applications for complex tasks of the future. In designing experiments for the outlined types, the boundaries of one particular type are easily transgressed. Consequently, personnel exploiting these paradigms should be well-based in experimental psychology, physiology, psychiatry, and engineering. (Author)

AD-633 198 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Oklahoma State Univ., Stillwater.
ASCHIAN REPLICATION AND EXTENSION.
Master's thesis,
by Joseph Anthony Cammalleri. May 66, 73p
Contract AF 33 (608)-1263

Descriptors: (*Decision making, *Group dynamics), Psychometrics, Behavior.

A study was conducted to determine the social effects of a unanimous majority of confederates of the experimenter on the yielding behavior of several types of minorities who made verbal judgments in an Aschian situation. Two naive partners (Togetherness Dyad) were subjected to the influence of the unanimous majority and the results compared to an additional experimental setting in which two partners who were previous friends (Friends Dyad) were subjected to the same influence. The dependent variable was the errors scored by the minorities which were responses that agreed with the deliberately erroneous estimates of the majority. It was predicted that the Friends Dyad would resist complying to the majority pressures to a significantly greater degree than would the Togetherness Dyad and that the Togetherness Dyad would resist compliance to the pressures of the majority to a significantly greater degree than would the Alone subjects. Findings and Conclusions: The predictions were confirmed. (Author)

AD-633 352 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of New York, Buffalo.
A STUDY OF SOME ROLE DIMENSIONS OF LEADER-FOLLOWER RELATIONS.
Technical rept.,
by James W. Julian, and Edwin P. Hollander. Apr 66, 21p TR-3
Contract Nonr-4679 (00),
Proj. NR177-269

Descriptors: (*Leadership, Perception (Psychology)), (*Group dynamics, Leadership), Behavior, Personality, Factor analysis, Motivation.

Willingness of group members to accept a leader's influence attempts was seen to depend on four perceived leader haracteristics: his comptetence, his interest in participating in the group activity, his interest in the group members, and the source of his authority, in terms of appointment or election. Levels of the four leader characteristics were systematically varied by a descriptive technique to comprise a 3 x 3 x 2 x 2 factorial design. Each cell consisted of 17 subjects given a particular description of a hypothetical leader incorporating one level of each of the leader characteristics. Subjects responded to the leader described by ratings on each of four role dimensions: 'continue as leader,' 'serve as group spokesman,' 'have as a follower,' and 'have as a friend.'. Except for source of authority, each attribute of the leader had a statistically significant impact on member acceptance and endorsement of him in each of the four role relationships. The leader described as 'good performer in the group activity', 'interested in group members,' and 'interested in the group activity' was most highly rated on each dimension. These results are consistent with an interactive approach to leadership which stresses the leader's perceived characteristics as a determinant of his ability to exert influence. (Author)

N66-15472 **Field 5J, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Defence Research Medical Labs., Toronto (Ontario).
A TABLE OF D' FOR A MODEL OF THE UNFORCED CHOICE EXPERIMENT,
by W. C. G. Fraser and M. M. Taylor. Jun 65, 32p
DRML-534

Descriptors: *Mathematical table, *Human perform ance, *Signal detection, *Statistical probability.

N66-15552 **Field 5J**
CFSTI Prices: HC$2.00 MF$0.50
Manitoba Univ., Winnipeg. Dept. of Psychology.
BIBLIOGRAPHY OF STUDIES ON SENSORY DEPRIVA- TION AND RELATED CONDITIONS,
by L. Bayer, D. Dobbs, and J. P. Zubek. 1965, 31p
Grant NIH G-MH-08748-01

Descriptors: *Sensory stimulation, *Bibliography, *Confinement, *Sensory deprivation, *Social isolation.

AD-632 798 **See Field 6A**

AD-632 877 **See Field 6C**

AD-632 942 **See Field 6C**

AD-633 059 **See Field 5I**

PB-170 094 **See Field 5C**

5K. SOCIOLOGY

AD-633 149 **Field 5K, 5D, 8F, 15D**
CFSTI Price: MF$3.00
American Univ., Washington, D. C. Foreign Area Studies Div.

AREA HANDBOOK FOR MALAYSIA AND SINGAPORE,
by Bela C. Maday, Susan E. Callaway, Gustavo A. Mellander, Elaine M. Themo, and John O. Weaver. Jul 65, 735p DA-PAM-550-45

Descriptors: (*Singapore, Handbooks), (*Malaya, Handbooks), History, Geography, Political science, Sociology, Economics, Police.

Identifiers: Malaysia.

This volume is one of a series of handbooks prepared by the Foreign Areas Studies Division (FASD) of The American University, designed to be useful to military and other personnel who need a convenient compilation of basic facts about the social, economic, political and military institutions and practices of various countries. The emphasis is on objective description of the nation's present society and the kinds of possible or probable change that might be expected in the future. It was compiled from information available in openly published material. Extensive bibliographies are provided to permit recourse to other published sources for more detailed information.

GA-5556 **Field 5K**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
APPLICATION OF NEUTRON ACTIVATION ANALYSIS IN SCIENTIFIC CRIME DETECTION, 18-MONTH SUMMARY REPORT FOR THE PERIOD MAY 1, 1962-OCTOBER 31, 1963,
by D. E. Bryant and V. P. Guinn. 27 Jul 64, 94p
Contract AT (04-3)-167

Descriptors: (*Criminology, Scientific research), (*Neutron activation, Criminology).

PB-170 059 **See Field 5C**

PB-170 079 **See Field 5C**

PB-170 094 **See Field 5C**

PB-170 105 **See Field 5C**

6A. BIOCHEMISTRY

AD-632 699 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Edward Davies Chemical Lab., Univ. Coll. of Wales, Aberystwyth.
CAROTENOID BIOSYNTHESIS IN PHOTOSYNTHETIC BACTERIA AND HIGHER PLANTS.
Final scientific rept., 1 Sep 63-30 Aug 65,
by Trevor W. Goodwin and Lionel J. Goad. 14 Feb 66, 18p
Grant AF-EOAR-24-63
AFOSR 66-0712

Descriptors: (*Steroids, Biosynthesis), (*Bacteria, Steroids), (*Plants (Botany), Steroids), Carotenoids, Photosynthesis, Chemical reactions, Tracer studies, Chromatographic analysis, Methionine, Great Britain.

Investigation on the biosynthesis of plant sterols are described. A number of possible phytosterol precursors were identified in peas and larch and include squalene, cycloartenol, 24-methylene cycloartenol, 24-methylene lophenol. The incorporation of (2-14C) mevalonic acid into these various compounds was demonstrated whilst the incorporation of (methyl-14C)-methionine was observed into those steroids which contain an extra alkyl group at C24 of the steroid side chain. Using mevalonic acid and methionine doubly labelled with 14C and tritium studies were made regarding the mechanism of alkylation of the phytosterol side chain. (Author)

AD-632 798 **Field 6A, 5J**
CFSTI Prices: HC$1.60 MF$0.50
Goteborg Univ. (Sweden). Inst. of Neurobiology.
NUCLEAR RNA CHANGES OF NERVE CELLS DURING A LEARNING EXPERIMENT IN RATS,
by H. Hyden and E. Egyhazi. 1963, 14p
Contract AF 61 (052)-248
AFOSR 2887

Descriptors: (*Learning, Ribonucleic acids), Nerve cells, Nuclei (Biology), Cytoplasm, Central nervous system, Vestibular apparatus, Sensory perception, Motor reactions, Purines, Pyrimidines, Adenine, Chromosomes, Rats, Sweden.

Identifiers: Uracil.

Purine-pyrimidine analyses were carried out on nuclear RNA and cytoplasmic RNA of neurons from rats subjected to a learning experiment during which established a pattern of sensory and motor abilities. Concomitantly, the adenine/uracil ratio of the nuclear RNA increased significantly as well as an increased amount of RNAper nerve cell. Control experiments excluded the possibility that the chemical changes observed in the nuclear RNA of the nerve cell were due to demands on the neural function per se. The nuclear RNA changes during learning were interpreted as an activation of regions on the chromosomes to produce nuclear (chromosomal) RNA with highly specific base ratios. (Author)

AD-633 210 **Field 6A, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
PLANT VITAMINS,
by A. Urman. Apr 66, 9p FSTC-HT-23-76-66
Proj. 2301-6553
TT 66-61276
Trans. from Ekonomicheskaya Gazeta (USSR) n47 p40-1 Nov 1965.

Descriptors: (*Plants (Botany), *Vitamins), Enzymes, Coenzymes, Vitamin B complex, Ascorbic acid, Metabolism, Additives, USSR.

The article considers the role of vitamins as organic catalysts in plant life and their relation to enzymes and coenzymes; examines vitamins C and B1 in some detail, and discusses attempts to enrich plants with vitamins as well as investigations into the relationship between plant life processes and vitamin concentration. (Author)

AD-632 914 **See Field 6P**

AD-633 209 **See Field 6H**

AD-633 211 **See Field 6H**

PB-169 542 **See Field 7E**

N66-18332 **Field 6B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
THE EFFECTS OF HIGH LUMINANCE SOURCES UPON THE VISIBILITY OF POINT SOURCES,
by R. F. Haines. 1965, 14p NASA-TM-X-56561
Presented at the Ann. Meeting of the Am. Astronautical Soc. (11th), Chicago, May 6, 1965.

Descriptors: *Point source, *Glare, *Luminous intensity, Visibility.

6C. BIOLOGY

AD-632 812 **Field 6C, 6R**
CFSTI Prices: HC$1.60 MF$0.50
Stockholm Univ. (Sweden). Dept. of Zoology.
OBSERVATIONS ON THE BEHAVIOR OF PIGEONS WITH RESTRICTED LESIONS IN THE TELENCEPHALON.
Technical rept. (final) App. 2,
by Eric Fabricius, Borje Larsson, Lennart Steen, and Bengt Akerman. 15 Oct 62, 11p
Contract AF 61 (052)-195

Descriptors: (*Pigeons, Behavior), (*Radiation effects, Behavior), (*Learning, Radiation effects), Brain, Radiation injuries, Radiological dosage, Protons, Memory, Histology, Sweden.

In 10 pigeons restricted lesions were made in the telencephalon by means of high energy proton beams. The lesions were situated in the posterior and medial striatum. All the pigeons were normal as regards eating, drinking and flying. When flying they were able to avoid obstacles and to land normally. The blinking reflexes and the reactions to sounds were normal in all the pigeons. Seven pigeons showed abnormally strong escape responses for 10 - 15 days after the radiation or in one case for all the time after the radiation while three pigeons were normal. In two pigeons the escape responses disappeared after about 60 days and in one pigeon these responses were very weakened after 55 days. In these three last pigeons, such behaviors were observed, as are otherwise seen in pigeons imprinted to man. These behaviors comprised aggressive pecking, wing vibrating and nodding. Wing vibrating was also observed occasionally with the pigeon with persisting strong escape responses. Learning experiments with 7 of the pigeons gave the result that two pigeons had a decreased ability of remembering compared with normal pigeons. These two pigeons had lesions in the medial striatum. In none of the pigeons have we seen behavioral changes of the kind seen as symptoms of fully decerebrated pigeons. (Author)

AD-632 813 **Field 6C**
CFSTI Prices: HC$2.60 MF$0.50
Stockholm Univ. (Sweden). Dept. of Zoology.
OBSERVATIONS ON THE DAMBUILDING BEHAVIOR OF THE BEAVER (CASTOR FIBER L.),
Final technical rept. app. 3,
by Lars Wilson. 15 Oct 62, 21p
Contract AF 61 (052)-195

Descriptors: (*Rodents, Be avior), Aquatic animals, Dams, Stimulation, Motor reactions, Swimming, Auditory signals, Visual signals, Sweden.

Identifiers: Beavers.

The experiments seem to indicate that the stimulus-situation which regulates the dam-building activities is comparatively simple. It seems to be clear that the dam building activity is released by acoustical stimuli from water running swiftly over the dam and by optical stimuli from indentations in the top of the dam. Optical stimuli from indentations in the up-stream side of the dam also release the pushing of material to the dam in the same way, as indentations round the lodge or tunnels release the lodge building activity. On the contrary, in the experiments the animals did not react to optical stimuli from water running over the dam or to any kind of stimuli from water being sucked through holes in the upstream side of the dam under the surface. If the water was running very swiftly over the dam the animals were building intensely on the dam at especially high water level, as well as at especially low water level. It then seems as if the water level has no direct effect on the dam building behaviour. On the contrary, a rising water level seems to have a releasing and stimulating effect on the lodge-building activity. (Author)

AD-632 877 **Field 6C, 5J**
CFSTI Prices: HC$1.10 MF$0.50
University Coll., London (England). Dept. of Anatomy.
CODING, CLASSIFICATION AND OPTIMISING OF LEARNING CHANGES IN OCTOPUS.
Final rept.,
by J. Z. Young. May 62, 8p
Contract AF 61 (052)-256

Descriptors: (*Cephalopoda, *Learning), Vision, Motivation, Brain, Nervous system, Nerve cells, Retina, Conditioned reflex, Behavior, Transfer of training, Nystagmus, Optimization, Great Britain.

Contents: Visual coding system; Implications of coding hypothesis; Reversal of training; Limits of transfer and generalization; Retina of octopus; Efferent fibres to the retina; Degeneration of the retina; Detection of polarized light; Eye-movements, nystagmus, and angle of attack; Size of brain and number of cells; Paired centers for motivation and for amplifying the classifying signals (reward and punishment); Optimization of learning changes; Paired centers in the touch learning system; Presence of paired motivation centers in other brains.

AD-632 942 **Field 6C, 5J**
CFSTI Prices: HC$2.00 MF$0.50
Oxford Univ. (England). Inst. of Experimental Psychology.
THE ELECTRORETINOGRAM IN THE COMPOUND EYE OF THE DESERT LOCUST (SCHISTOCERCA GREGARIA FORSKAL).
Technical note,
by D. M. Vowles. 1 Jul 61, 33p TN-2
Contract AF 61 (052)-420
AFOSR 3221

Descriptors: (*Orthoptera, *Electroretinography), Adaptation (Physiology), Vision, Eye, Arthropods, Retina, Illumination, Thresholds (Physiology), Visual perception, Great Britain.

Identifiers: Critical flicker frequency.

The form of the locust electroretinogram depends upon the type of electrode used, and the contact of the electrode with the retina. The critical flicker frequency was measured. This is of the order of 30-40 c.p.s. under the conditions of illumination used. The c.f.f. is higher when the flicker is produced by a moving shadow than when produced by stroboscopic illumination. Dark adaptation takes about 30 minutes. If the ventral region of the eye is illuminated, the threshold for the dorsal region of the eye is raised. The results are compared with those of previous workers and in the light of Autrum's categories of slow and fast types of compound eye. (Author)

N66-17271 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Aerospace Medical Inst., Pensacola, Fla.
MODIFICATION OF VESTIBULAR SENSITIVITY IN THE RAT,
by A. Eskin, M. Igarashi, and D. C. Riccio. 17 Nov 65, 21p Rept. no. 125, NAMI-950
Contract NASA Order-R-93
NASA CR-70394

Descriptors: *Animal study, *Vestibular effect, *Physiological response, *Rat, *Rotating environment.

N66-17272 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Aerospace Medical Inst., Pensacola, Fla.
ARCHITECTURE OF THE OTOLITH END ORGAN WITH SOME FUNCTIONAL CONSIDERATIONS,
by M. Igarashi. 8 Dec 65, 19p Rept. no. 127, NAMI-952
Contract NASA Order-R-93
NASA CR-70393

Descriptors: *Membrane structure, *Otolith.

N66-18163 **Field 6C**
CFSTI Prices: HC$4.00 MF$1.00
California Univ., Berkeley. Space Sciences Lab.
ENZYME ACTIVITY IN TERRESTRIAL SOIL IN RELATION TO EXPLORATION OF THE MARTIAN SURFACE.
Semiannual progress rept. no. 3, 1 Jul-31 Dec 65, by A. D. McLaren and J. J. Skujins. 14 Jan 66, 148p
Grant NsG-704
NASA CR-70058

Descriptors: *Mars probe, *Enzyme activity, *Soil, *Telemetry.

N66-18369 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
FURTHER NOTES ON THE CENTRE MEDIAN NUCLEUS OF LUYS,
by W. R. Mehler. 1965, 33p NASA-TM-X-56159

Descriptors: *Central nervous system, *Anatomy, *Brain stem, *Neurology.

AD-633 210 **See Field 6A**

AD-633 355 **See Field 6S**

ORNL-P-1211 **See Field 6R**

TID-21460 **See Field 6R**

UCRL-14473 **See Field 5B**

6D. BIONICS

AD-632 842 **Field 6D**
CFSTI Prices: HC$1.10 MF$0.50
Comitato Nazionale per l'Energia Nucleare, Naples (Italy).
NEURAL MECHANISM OF CEREBELLAR FUNCTION.
Annual summary rept.,
by Valentino Braitenberg. Jun 61, 9p
Contract AF 61 (052)-96

Descriptors: (*Bionics, Medical research), (*Brain, Bionics), Cerebellum, Cerebral cortex, Italy, Cybernetics, Neurology, Laboratory animals.

AD-633 137 **Field 6D**
CFSTI Prices: HC$3.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
PROJECT PARA: PERCEIVING AND RECOGNITION AUTOMATA.
Final rept.,
by J. L. Muerle. Dec 63, 51p CAL-VG-1196-G-9
Contract Nonr-2381 (00),
Proj. NR-048-121
See also AD-256 582.

Descriptors: (*Automata, *Perception), (*Artificial intelligence, *Pattern recognition), Classification, Adaptive control systems, Training, Brain, Models (Simulations).

Identifiers: PARA Project, Perceptrons, Alpha-numeric symbols.

Conclusions: The perceptron concept which this project developed has been shown to be of both theoretical and practical value. Its original purpose, that of a brain model, has been a motivating force for most of the work described in Section 2 (summary of results obtained between July 1957 and December 1960), but has had less influence on later work on this project. The practical, in an engineering sense, application of the perceptron concept has been far reaching. Early perceptron studies showed the value of a perceptron system as a pattern recognition and classification system. With this idea as a nucleus, numerous projects were established to study the contribution which a perceptron system might have in the solution of a variety of pattern recognition problems. At CAL, Project PICS was established to study the value of perceptron pattern classification systems in automatic photointerpretation. A large number of research projects in the areas of both theory and practice have been created by the interest aroused by early perceptron work. (Author)

AD-633 200 **Field 6D**
CFSTI Prices: HC$4.00 MF$1.00
Purdue Univ., Lafayette, Ind.
AN ADAPTIVE PATTERN RECOGNIZING MODEL OF THE HUMAN OPERATOR ENGAGED IN A TIME VARYING CONTROL TASK.
Doctoral thesis,
by Edwin E. Gould. Jun 66, 129p
Contract AF 33 (608)-1270

Descriptors: (*Cybernetics, Operators (Personnel)), (*Bionics, *Pattern recognition), (*Adoptive systems, Bionics), Time studies, Mathematical models, Management engineering, Industrial research.

A model is presented in this study which describes the input-output response of a human operator engaged in the task of manually controlling a certain class of plants. The problem is approached from an engineering point of view in which the human operator is viewed as an adaptive controller performing the functions of identification, decision, and modification while manually controlling the plant. The emphasis in this study is not to merely reproduce the human operator response by arbitrarily constructing an adaptive controller and then minimizing the differences in the responses, but to incorporate the known physiological structure of the human in the model and synthesize an adaptive controller that identifies, decides and modifies in a manner that resembles the human operator as closely as possible. The control task treated is a one-dimensional compensatory visual-manual tracking task which visually displays the error to the subject and a control mechanism is provided to allow error compensation. From experimental tests it was found that the human operator uses pattern recognition to classify a limited variety of plants into one of three categories. The nature of the recognition problem is investigated and the decision surfaces associated with the pattern recognition process measured. A pattern recognition process was included in the model to simulate this part of the plant identification process. (Author)

AD-632 806 **See Field 9C**

AD-633 002 **See Field 9B**

6E. CLINICAL MEDICINE

AD-632 702 **Field 6E, 20G**
CFSTI Prices: HC$1.00 MF$0.50
Uppsala Univ. (Sweden).
ON THE APPLICATION OF A 185 MeV PROTON BEAM TO EXPERIMENTAL CANCER THERAPY AND NEUROSURGERY. A BIOPHYSICAL STUDY.
Inaugural dissertation,
by Borje Larsson. Mar 62, 20p
Contract AF 61 (052)-183
See also AD-233 372, PB-153 304.

Descriptors: (*Proton beams, *Surgical techniques), Brain, Surgery, Cancer, Therapy, Sweden.

There is reason to believe, even if surgical, chemical and immunologic methods will eventually replace radiation in such therapy, that the localized irradiation of tissues deep in the body will persist as an important therapeutic procedure for other reasons. This belief is based on the observation of the increasing number of therapeutic procedures in which ionizing radiation has been suggested for various purposes, e.g. for influencing the function of the pituitary gland in cases of endocrine disorder, for destroying the function of cerebral fibre tracts or nuclei, as considered above, for destroying the defense of the body against foreign transplanted tissues, for stimulating the vasculariza-

tion of the myocardium in cases of insufficient coronary circulation, and for oto-microsurgery. The results of the present study show that beams of charged heavy particles represent a versatile type of radiation which may be used to advantage in such studies of the effects of local irradiation as might be of value in the design of therapy.

AD-632 865 **Field 6E, 15C, 13B, 15A**
CFSTI Prices: HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C. Operations Research and Economic Div.
ENVIRONMENTAL HEALTH PLANNING FOR POSTATTACK CONDITIONS: SOME PROBLEMS, PROGRAMS, AND PRIORITIES.
Final rept.,
by Raphael J. Salmon. Apr 66, 80p R-OU-197
Contract PH-86-65-16, OCD-PS-64-168

Descriptors: (*Management planning, *Public health), (*Public health, Nuclear warfare), Civil defense systems, Operations research, Diseases, Disease vectors, Survival, Food, Housing, Water supplies, Wastes (Sanitary engineering), Nuclear warfare casualties.

Identifiers: Postattack operations.

Conditions imposed by massive nuclear attack can be expected to disrupt normal environmental health services of communities throughout the United States, and to threaten the health of surviving population. This study develops a framework to help decision-makers evaluate postattack conditions relative to environmental health. Review and analysis of existing information on probable postattack conditions as they might affect, and be affected by, personnel of local health departments, public health organization, and resource management practices is presented. Anticipated postattack environmental health problems are identified, and priority judgments are made on a comparative basis in terms of level of gravity. Rationale supporting the judgments is included, and both action and research programs to improve preparedness are recommended. Important sources of data prescribed for this study were the reports and working papers of an earlier U. S. Public Health Service Project. 'Environmental Health Problems in the Post Shelter Period'. In addition, four city health departments were visited to assist in analysis of normal environmental health conditions relative to those expected in a postattack recovery period and of the ability of a local health agency to cope with projected conditions. (Author)

AD-632 894 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
National Jewish Hospital, Denver, Colo. Dept. of Experimental Immunology.
BIOCHEMICAL AND PHYSIOLOGICAL FACTORS OF THE IMMUNE RESPONSE.
Annual progress rept., 1 May 65-30 Apr 66,
by Ignatius L. Trapani, Dan H. Campbell, Laszlo Kalmer, andThomas Mutz. 1 Jun 66, 4p
Contract Nonr-3545 (00),
Proj. NR-108-599

Descriptors: (*Immunology, High altitude), (*Acclimatization, Immunity), Environment, Antigens ; antibodies, Adrenal glands, Excision, Serum albumin, Adaptation (Physiology), Cold weather tests, Immune serums, Gamma globulin, Electrophoresis, Rabbits, Guinea pigs.

Antibody formation in adrenalectomized rabbits at high altitude is under study. A group of rabbits were acclimatized for 30 days to 10,600 feet at Echo Lake, then bilaterally adrenalectomized. A control group of adrenalectomized rabbits was maintained in Denver. After four weeks of recuperation both groups were given a primary i.v. immunization with bovine serum albumin (BSA). Seven weeks later a secondary immunization with BSA was given. Serum samples were obtained at appropriate intervals and analyzed for precipitating antibody. High-altitude adapted and adrenalectomized rabbits exhibit a depressed primary immune response which reaches maximum titers later than high-altitude controls; the time sequence of the secondary response is similar to controls but the titers achieved are lower.

AD-633 042 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
HIP PROSTHESIS WITH SILASTIC COVERING.
Technical rept.,
by John W. Hodge Jr. Mar 66, 10p TR-6603
Proj. DA-3A025601A821

Descriptors: (*Prosthetics, *Legs), Silicone plastics, Wear resistance, Plastic coatings, Loading (Mechanics), Halocarbon plastics.

Identifiers: Silastic.

A femoral hip prosthesis with a silastic covering in the head area was evaluated to determine its ability to withstand repeated loads of the order of those encountered in a normal hip. The evaluation consisted primarily of a cyclic test in which the prosthesis was loaded to 600 pounds each cycle. The evaluation was terminated after 231,600 cycles. Approximately .001 inch of wear was observed at the end of the test. (Author)

AD-633 043 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biochemical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
USAMBRL SHOULDER UNIT LABORATORY EVALUATION AND FITTING PROCEDURES.
Technical rept.,
by John W. Hodge Jr., and Robert Plumb. Mar 66, 17p TR-6606
Proj. DA-3A025601A821

Descriptors: (*Prosthetics, *Arms), Joints (Physiology), Torque, Friction, Amputees, Amputation stumps, Tests.

The unit contained a friction adjustment for varying torque in the extension-flexion direction, and a free-swing feature in the adduction-abduction direction. The evaluation consisted of cycling the pulley system, and determining the ability of the unit to sustain and retain torque. The fitting procedures described are applicable to fitting a fore quarter type amputee. Field tests were recommended for this device. (Author)

AD-633 091 **Field 6E, 6P, 6T**
CFSTI Prices: HC$1.00 MF$0.50
Florida Univ., Gainesville. Coll. of Medicine.
CAPILLARY DEVELOPMENT DURING EXPOSURE TO CHRONIC HYPOXIA.
Rept. for 1 Jan-30 Jun 65,
by S. Cassin, R. D. Gilbert, and E. M. Johnson.Feb 66, 12p
Contract AF 41 (609)-2421,
Proj. AF-7758,
Task 775801
SAM TR-66-16

Descriptors: (*Hypoxia, Capillaries), (*Capillaries, Measurement), High altitude, Growth, Pathology, Rats, Decompression.

A group of 18 male rats weighing initially 110 to 131 gm. was exposed to a pressure altitude of 20,000 feet for 36 days in a decompression chamber. A similar group of 18 male rats was maintained at sea level for a like period. Hematocrits and organ-to-body-weight ratios were measured for heart, testes, adrenals, and kidneys in all animals at the end of the period. Capillary counts in heart, gracilis, and psoas muscles were made by utilizing a specific stain for endothelial cells. The hematocrit ratio and all measured organ-to-body-weight ratios increased significantly in the chronically hypoxic rats. A significant increase in capillary counts was also found in these animals. On the basis of these preliminary studies, it would appear that in chronic hypoxia, there is an increase in vascularity due to an increase in capillary number rather than an increased patency of existing vessels. (Author)

AD-633 194 **Field 6E, 11F**
CFSTI Prices: HC$3.00 MF$0.50
Michigan Univ., Ann Arbor.
ALUMINUM ALLOY IN PROSTHETIC DENTISTRY: TECHNICS AND APPLICATIONS.
Master's thesis,
by Lucius L. Robinson. 1966, 55p
Contract AF 33 (608)-1252

Descriptors: (*Teeth, Prosthetics), (*Prosthetics, Dentistry), (*Aluminum alloys, Prosthetics), Casting, Casting alloys, Saliva, Corrosion, Surgical supplies, Speech, Magnesium alloys, Tissues (Biology), Measurement.

A limited laboratory study was made to compare the general appearance and accuracy of aluminum castings made from a standard pattern using three different investments. Three castings were made with each investment. Gray investment was used because recent studies and clinical experience have shown satisfactory results can be obtained with this material. Another hydrocal-bonded investment (investic) was used because this material may be desirable when aluminum is cast onto metal mold inserts. A phosphate-bonded investment (multivest) was used following the rapid jelling shell investment procedure because of the speed with which a casting can be obtained. Good castings of similar appearance were obtained with each investing material. The two hydrocal-bonded investments produced castings of similar accuracy when measured with a surface meter. Repeated measurements of one casting demonstrated that the fit of an aluminum denture base can be destroyed by careless polishing. An aluminum alloy was used to construct prosthetic appliances for clinical patients. These included a partial denture and a speech aid appliance which had wrought wire clasps, surgical splints, and a complete denture with an aluminum occlusal surface. The initial evaluation of these appliances is discussed and the other clinical observations are reported. (Author)

AD-633 250 **Field 6E, 5E**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Los Angeles. Dept. of Engineering.
UPPER EXTREMITY PROSTHETICS RESEARCH. HUMAN TRACKING. SENSORY MOTOR CONTROL. MYOELECTRIC CONTROL.
Biotechnology laboratory progress rept., 15 Jan-15 Apr 66,
by John Lyman. 15 Apr 66, 20p UCLA-DE-66-28
Contracts N123 (60530)32857A, AF 33 (615)-1969
Sponsored in part by Veterans Administration, Washington, D. C., Contract V1005p-9779, and Grant VRA-RD-120m-64. See also AD-628 964.

Descriptors: (*Prosthetics, Medical research), (*Artificial limbs, Pneumatic devices), (*Tracking, Performance (Human)), (*Amputees, Therapy), Transducers, Electrical equipment, Surgical techniques, Control systems, Muscles, Training, Motion, Hands, Arms, Motor reactions, Rehabilitation, Design.

Identifiers: Electromyography.

CONTENTS: Upper extremity prosthetics research: Experimental investigation of the Heidelberg Pneumatic Arm; experimental investigation of the Northwestern Attitudinal Controlled Elbow; experimental investigation of the French Electric Hand; exploration of minor surgical methods for developing new body control sites; exploration of new harnessing techniques for transducers; evaluation of tentative design criteria for ex-

ternally powered prostheses. Research on sensory motor control: Experimental investigations of the AIPR Pneumatic Arm; experimental investigations of functional muscle isolation by training; development of an external logic system for prosthetic motion control. Research on the performance of human operators of tracking system: Function generator; reports; experimentation. Research on myoelectric control systems: Unidimensional EMG control to a self-paced input; unidimensional EMG control to a step input.

AD-633 366 **Field 6E, 6M**
Walter Reed Army Inst. of Research, Washington, D. C. Dept. of Experimental Pathology.
ENZYME HISTOCHEMISTRY OF ACUTE STAPHYLOCOCCAL ENTEROTOXIN GASTROENTERITIS IN RHESUS MONKEYS,
by Thomas H. Kent, Helen R. Jervis, andJames G. Kuhns. 11 Oct 65, 15p

Descriptors: (*Gastrointestinal system, Diseases), (*Toxins ; antitoxins, Gastrointestinal system), (*Staphylococcus, Toxins ; antitoxins), (*Enzymes, Gastrointestinal system), Histology, Mucus, Membranes (Biology), Stomach, Intestines, Lipids, Phosphoric monoester hydrolases, Oxidoreductases, Pathology, Monkeys.

Rhesus monkeys given 150 micrograms of purified staphylococcal enterotoxin B developed acute gastroenteritis. This was well developed at 2 hours, maximal at 4 to 8 hours and rapidly regressed 12 to 72 hours after enterotoxin administration. These features were compared with changes in enzyme activities (acid and alkaline phosphatase, glucose-6-phosphatase, DPNH and TPNH diaphorases, succinic dehydrogenase, glucose-6-phosphate dehydrogenase and the hexokinase system). In the gastric mucosa at the height of the lesion there was a slight reduction of enzyme activity in surface mucous epithelium and a slight increase in acid phosphatase activity in chief cells. No change was demonstrated in parietal cell enzymes. In jejunal epithelium a rapid decrease and recovery of enzyme activity was noted. This correlated well with alterations in the structure of the epithelium. In the ileum, where epithelial alterations were not conspicuous, changes in enzyme activity were slight. Lipid droplets disappeared from the jejunal mucosa and appeared in the ileal mucosa at the height of the lesion suggesting an alteration in the pattern of fat absorption. (Author)

AD-632 823 **See Field 5J**

AD-633 049 **See Field 1B**

AD-633 092 **See Field 6P**

AD-633 119 **See Field 6O**

AD-633 168 **See Field 6L**

6F. ENVIRONMENTAL BIOLOGY

AD-632 780 **Field 6F, 15B, 6M, 6O, 8M**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
CBE FACTORS: MONTHLY SURVEY NO. 4.
ATD work assignment no. 50.
1966, 72p ATD-66-28
TT 66-61252
Based on Communist World open sources. See also AD-628 553.

Descriptors: (*Biological warfare agents, Bibliographies), (*Chemical warfare agents, Bibliographies), (*Aerosols, Bibliographies), Fertilizers, Pesticides, Nervous system, Drugs, Hallucinogens, Microorganisms, Bacterial aerosols, Epidemiology, Immunity, Ecology, Agriculture, Meteorology, Boundary layer, Soils, USSR.

The survey, based on Communist World open sources, is the fourth in a series of monthly surveys covering the following areas: I. Chemical factors (pesticides, herbicides, fertilizers, psychotomimetics, other chemicals); II. Biological factors (pathogens); III. Environmental factors (aerosols, ecology, micrometeorology, soil science).

6H. FOOD

AD-633 044 **Field 6H**
CFSTI Prices: HC$4.00 MF$0.75
Archer Daniels Midland Co., Minneapolis, Minn.
EDIBLE COATINGS FOR DRIED AND COMPACTED FOODS: PART I.
Final rept., pt. I,
by Morton S. Cole. Apr 66, 109p
Contract DA-19-129-AMC-102 (N),
Proj. DA-7X84-06-033
USA NLABS FD-47, USA NLABS TR-66-37-FD

Descriptors: (*Food, *Coatings), Dehydrated foods, Films, Moisture, Humidity, Molds (Organisms), Storage, Atmosphere, Oxygen, Ethyl cellulose, Glycerols, Glycols, Esters, Proteins, Gelatins, Benzoates, Aliphatic compounds, Carboxylic acids, Temperature, Preservation, Brittleness.

Identifiers: Glycerides, Sorbic acid.

Studies are presented on the development of edible barrier materials, their application to dehydrated foods and evaluation under accelerated storage conditions, effects of atmospheric oxygen and moisture, fragmentation and abrasion, and attack by microorganisms. The most effective coating materials include hot melts of acetoglycerides and ethylcellulose; mixtures of monoglycerides and polyglycolesters; protein films including soy proteinate and gelatin; fatty esters of amylose; monoglycerides; hard fats; and combinations of these materials in the form of laminates or mixtures. Approved chemical preservatives, including sorbic acid, potassium sorbate, methyl and propyl p-hydroxybenzoates, were effective in retarding mold growth when incorporated in coating formulations. Author)

AD-633 209 **Field 6H, 6A**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
BIOCHEMISTRY AND THE FOOD INDUSTRY,
by A. I. Oparin. May 66, 18p FSTC-HT-23-103-66
Proj. 2301-6553
TT 66-61275
Trans. of Priroda (USSR) n11 p17-24 1965.

Descriptors: (*Food, *Biochemistry), Irradiated foods, Preservation, Storage, Ventilation, Enzymes, Vitamin B complex, Additives, Vitamins, Antibiotics, Amino acids, Wastes (Industrial), Vegetables, USSR.

A description of the use of irradiation to inhibit the biochemical processes in stored grain, sugar beets, potatoes, etc. The effect of forced ventilation on potato storage is mentioned. The use of ferments made from fungi for processing sugarbeet and brewery wastes into vitamin B12 concentrates is discussed. The advantages of using vitamins, antibiotics, and amino acids are illustrated graphically. (Author)

AD-633 211 **Field 6H, 6A**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
CHROMATOGRAPHIC INVESTIGATION OF SUGARS IN HEAT PROCESSING OF FRUIT CONCENTRATES,
by I. Vashatko, and A. Pribela. May 66, 11p
FSTC-HT-23-77-66
Proj. 2301-6553
TT 66-61277
Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya (USSR) n6 p17-20 1965.

Descriptors: (*Fruits, *Carbohydrates), (*Beverages, Carbohydrates), Pyrolysis, Chromatographic analysis, Photometric analysis, Fructoses, Glucose, Sucrose, Hydrolysis, Aldehydes, Acetones, USSR.

The decomposition of sugars in fruit juice concentrates, due to heating, was investigated by means of paper chromatography and photometry. Fructose and glucose are stable. Sucrose hydrolyzes rapidly, forming low-molecular compounds, mainly oxymethyl furfural and dihydroxy-acetone. The formation of melanoidines causes darkening.

AD-633 267 **Field 6H, 15E**
CFSTI Prices: HC$3.00 MF$0.75
FMC Corp., Santa Clara, Calif. Central Engineering Labs.
INVESTIGATION OF DRYING PROCEDURES FOR COMPACTED FOODS.
Final rept. 18 Mar 64-17 May 65,
by L. F. Ginnette. May 66, 68p
Contract DA-19-129-AMC-228 (N),
Proj. DA-1K43303D548
ANL TR-66-34-FD, ANL FD-46

Descriptors: (*Dehydrated foods, *Drying), Military rations, Density, Storage, Surface properties, Rods, Acceptability, Processing.

Compressed food bars representing protein, carbohydrate and fat in all proportions likely to be encountered with natural products and adjusted to 15 - 25 percent moisture were dried in a forced draft air drier under controlled conditions to a residual moisture content below 5 percent. Rates of drying were studied in relation to wet and dry bulb temperatures of the air flow, composition of bars, shape of bars and pressure of compression. Observations were performed to identify the effect of the drying regimen on surface texture, density, migration of fat and soluble components, and organoleptic properties. Conditions for a practical air drying process were defined. (Author)

AD-633 390 **Field 6H, 6M**
CFSTI Prices: HC$3.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
A STUDY OF THE MICROBIOLOGY OF SELECTED DEHYDRATED FOOD PRODUCTS.
Final rept. 15 Oct 63-15 Oct 65,
by F. E. Wells. May 66, 55p
Contract DA-19-129-AMC-206 (N),
Proj. DA-1K643303D548
ANL TR-66-35-FD, ANL FD-49

Descriptors: (*Dehydrated foods, Freeze drying), (*Microorganisms, Viability), (*Biological contamination, Dehydrated foods), Preservation, Storage, Bacteria, Metabolism, Fruits, Vegetables, Meat, Military rations.

The effect of freeze-drying on the viability of six species of bacteria on seven kinds of food is presented. Freeze-drying influences are presented and discussed in relation to the effects of freezing, drying and storage conditions. The influence of food type and physiological age of bacteria is shown to influence both immediate losses in viability as well as the rate at which such losses occur during storage. The rate of decline in bacterial viability during storage is discussed as a function of the degree of metabolic injury sustained by the bacteria during the freeze-drying process. (Author)

UCD-34P80-3 **Field 6B**
CFSTI Prices: HC$5.00 MF$1.00
California Univ., Davis. Dept. of Pomology.
RADIATION TECHNOLOGY IN CONJUNCTION WITH POSTHARVEST PROCEDURES AS A MEANS OF EXTEND- ING THE SHELF LIFE OF FRUITS AND VEGETABLES.

Rept. for 1 Feb 64-30 Jan 65,
by E. C. Maxie, N. F. Sommer, and D. S. Brown. 1965, 195p
Contract AT (11-1)-34

Descriptors: (*Irradiated foods, Fruits), (*Vegetables, Irradiated foods).

AD-633 045 See Field 5J

PB-169 749 See Field 5C

PB-170 023 See Field 5C

PB-170 070 See Field 5C

PB-170 080 See Field 5C

PB-170 100 See Field 5C

PB-170 104 See Field 5C

PB-170 124 See Field 5C

PB-170 153 See Field 5C

PB-170 187 See Field 5C

PB-170 198 See Field 5C

PB-170 201 See Field 5C

6J. INDUSTRIAL (OCCUPATIONAL) MEDICINE

AD-632 913 **Field 6J, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Human Engineering Lab., Aberdeen Proving Ground, Md.
MAXIMUM NOISE LEVEL FOR ARMY MATERIAL COMMAND EQUIPMENT,
by Robert F. Chaillet, and Georges R. Garinther. Jun 65, 13p HEL Standard S-1-63B
HEL Standard S-1-63A, Superseded.

Descriptors: (*Noise, Military medicine), (*Military personnel, Tolerances (Physiology)), Standards, Industrial psychology, Stress (Physiology), Communication systems.

The standard establishes the maximum noise level permitted at personnel occupied spaces of equipment designed, developed or procured by AMC. It establishes the testing requirements for determining conformance to the maximum noise level permitted.

RL-SA-3682 See Field 6Q

6K. LIFE SUPPORT

AD-633 063 **Field 6K**
CFSTI Prices: HC$6.00 MF$1.25
Lockheed Missiles and Space Co., Sunnyvale, Calif.
DEVELOPMENT AND TEST OF A PROTOTYPE ADVANCED BIOMEDICAL SYSTEM.
Final rept.,
by S. A. Hall, and J. B. Taffe. Apr 66, 229p
Contract AF 18 (600)-2755,
Proj. AF-6770
AMD TR-66-1

Descriptors: (*Life support, Tests), (*Closed ecological systems, Life support), Space biology, Performance (Engineering), Metabolism, Respiration, Space simulation chambers, Instrumentation, Oxygen equipment, Chimpanzees.

The development and ground test of a non-flyable, functional prototype life-support system was undertaken. The system was designed to support a 50-pound chimpanzee, or the metabolic equivalent, for 30 days (with a safety factor of at least 3 - to make 90 days) in simulated orbit. The system consisted of a sealed life cell for housing the test specimen and his metabolic support equipment plus a service module for supporting both the life cell and its environmental control system (ECS). The ECS was designed to maintain a sea-level pressure, oxygen-nitrogen environment within the life cell. Following a shakedown test to prove out the hardware without a test subject, a test series, with animals, was initiated. The test objectives were (1) to obtain engineering data for a future Bioastronautics Flight Research Program, (2) to ascertain the psycho-physiological effects of prolonged confinement in a micro-atmosphere on the test subjects, and (3) to acquire baseline data relative to atmospheric contaminants in the environment for the time in question. A total of 25 days of animal testing was achieved in an altitude and temperature controlled chamber using four different animals. Medical problems with the animals prevented reaching the 30-day goal with a single specimen. However, the ECS operated continuously for the full 30 days without malfunction, and the life-support system successfully demonstrated its adaptability to a flight program. (Author)

AD-633 355 See Field 6S

6L. MEDICAL AND HOSPITAL EQUIPMENT

AD-633 168 **Field 6L, 6E, 6P**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
SPASTIC EXTENSION SPLINT.
Final technical rept.,
by George J. Thorpe, Theodore J. Bushey, Robert P. Plumb, and Stanley W. Baker. Mar 66, 10p
TR-6604
Proj. DA-3A025601A821-01

Descriptors: (*Medical supplies, Design), (*Contraction, Muscles), (*Brain, Wounds ; injuries), Joints (Physiology), Therapy.

Brain damage in the adult often leads to the development of either unilateral or bilateral spasticity of the extremities. A splint has been developed to help control the problems presented by spastic contracture in the major joints in the brain injured patient. (Author)

AD-633 169 See Field 7D

AD-633 208 See Field 6M

6M. MICROBIOLOGY

AD-632 789 **Field 6M**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
A STUDY OF THE HEMAGGLUTININ OF CLOSTRIDIUM BOTULINUM.
Final rept.,
by Lloyd K. Moss. 1 Mar 66, 36p
Contract DA-49-092-ARO-74,
Proj. SRI-BU-5280

Descriptors: (*Clostridium botulinum, Agglutinins), Toxins ; antitoxins, Biological assay, Erythrocytes, Counting methods, Chromatographic analysis, Immunology, Amino acids, Molecular weight, Absorption, Proteins, Toxicity.

Identifiers: Coulter counters.

The hemagglutinin of type A toxin behave in gel filtration chromatography like a high molecular weight substance, separating into two peaks of hemagglutination activity that may be related as monomer and dimer. There was no relationship between the ultraviolet absorption of hemagglutinin solutions and the hemagglutination activity. Amino acid analyses were performed on partially purified mixtures of neurotoxin and hemagglutinin, a high molecular weight component free of hemagglutinin, a related high molecular weight component with the greatest hemagglutination activity of the chromatogram, and crystalline toxin. There were close similarities in amino acid composition. The hemagglutinin probably contains little tryptophan because of the independence from ultraviolet absorbance. The absence of methionine in the initial high molecular weight peak suggests that it is maybe a nontoxic impurity. The concentration of hemagglutinin in the partially purified toxin-hemagglutinin complex is estimated at 1% by weight. The hemagglutinin probably is a protein, in agreement with other hemagglutinins, but this fact must be firmly established. It would be unwise to depend on identification of botulinum toxin by its property of hemagglutination, because this activity can be easily removed without seriously diminishing the toxicity.

AD-633 208 **Field 6M, 6L, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
PLASTICS AND SYNTHETIC POLYMERS IN MEDICAL MICROBIOLOGY,
by V. N. Tarasov. May 66, 13p FSTC-HT-23-85-66
Proj. 2301-6553
TT 66-61274
Trans. of Zhurnal Microbiologii, Epidemiologii and Immunobiologii (USSR) n12 p121-6 1965.

Descriptors: (*Plastics, Microbiology), (*Pharmacology, Polymers), Culture media, Medical equipment, Reviews, Viruses, Styrene plastics, Tissues (Biology), Acrylic resins, Polyamide plastics, Polyethylene plastics, USSR.

A survey of the published literature on the utilization of plastics and other polymeric materials in microbiology and virology is presented. Emphasis is placed on the use of polystyrene, polymethylmethacrylate, polyamides, polyethylene and other plastics and synthetic polymers as materials for growing cell, tissue and virus cultures, performing serological investigations, freezing tissues and cells, and producing antibacterial and antiviral preparations. (Author)

N65-20977 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Dallas. Southwestern Medical School.
INFLUENCE OF GRAVITY ON UNICELLULAR ORGANISMS.
Progress rept. for 1 Dec 61-1 May 62.
1 May 62, 2p
Grant NsG210 62
NASA CR-57792

Descriptors: (*Space biology, Bacteria).

Identifiers: Unicellular organisms.

N66-16968 **Field 6M**
CFSTI Prices: HC$3.00 MF$0.50
Stanford Univ., Calif. Instrumentation Research Lab.
MEMBRANE SEPARATION,
by J. Lundstrom. 6 Oct 65, 53p IRL-1012
Grant NsG-81
NASA CR-70190

Descriptors: *Permeability, *Teflon, *Carbon dioxide, *Glucose, *Silicone rubber.

AD-632 780 See Field 6F

AD-633 366 See Field 6E

AD-633 390 See Field 6H

TID-21679 See Field 6R

6O. PHARMACOLOGY

AD-632 971 **Field 6O**

Agricultural Research Council, Babraham (England). Inst. of Animal Physiology.

EFFECT OF DRUGS ON THE NORADRENALINE CONTENT OF BRAIN AND PERIPHERAL TISSUES AND ITS SIGNIFICANCE,

by Saroj Sanan, and Marthe Vogt. 17 Oct 61, 19p

Contract AF 61 (052)-367

AFOSR 3463

Descriptors: (*Levarterenol, Brain), (*Drugs, Levarterenol), Tissues (Biology), Autonomic nervous system, Ganglia, Dosage, Reserpine, Amphetamines, Hypnotics + sedatives. Antioxidants, Heart, Cats, Rabbits, Great Britain.

Identifiers: Methoserpidine, Guanethidine, Dimethylphenyl piperazinium iodide, Pheniprazine, Phenylhydrazinobutane.

Large single doses of methoserpidine (12 mg/kg given to rabbits lowered the noradrenaline content of sympathetic ganglia but not that of brain; no sedation was observed. Cats responded to doses ranging from 12 to 0.5 mg/kg with loss of noradrenaline from ganglia as well as from brain, and were sedated by the drug. The effect in man resembles that in the rabbit. Only within the group of reserpine-like drugs do sedation and loss in hypothalamic noradrenaline run parallel. These effects are therefore not causally related. Guanethidine lowers the noradrenaline content of sympathetic ganglia (cats and rabbits), but this effect does not explain the blocking action of the drug on the adrenergic nerve. Effects on the noradrenaline of the brain are variable and may be caused reflexly rather than by direct central action of guanethidine. Repeated intravenous injections of dimethylphenyl piperazinium iodide for a period of 4 hr did not produce any significant change in the noradrenaline content of ganglia or brain of rabbits. In contrast, dexamphetamine (20 mg/kg) produced a small but significant mean fall in noradrenaline content of the superior cervical ganglia and in that of the brain, but the effects were not seen in every rabbit. Prolonged administration of the monoamine oxidase inhibitors pheniprazine and phenylhydrazinobutane raised the noradrenaline content of the brain of rabbits but not that of cats, wheras it raised the noradrenaline of the ganglia of cats but not (or rarely) that of rabbits. The question of correlation between a rise in the noradrenaline content of the brain and certain clinical signs is discussed. (Author)

AD-633 119 **Field 6O, 6P, 6E**

CFSTI Prices: HC$1.00 MF$0.50

School of Aerospace Medicine, Brooks AFB, Tex.

EFFECTS OF PREDNISOLONE AND TRIAMCINOLONE ON CORTICOSTEROID LEVELS IN PAROTID FLUID, SERUM, AND URINE.

Rept. for Jun 65-Jan 66, .

by Robert L. Jenson, and Ira L. Shannon. Mar 66, 16p SAM-TR-66-24

Proj. 7755

Descriptors: (*Corticosteroid agents, Secretion), Saliva, Blood serum, Urine, Dosage, Excretion.

A simultaneous determination was made of 17-OHCS in serum, urine, and parotid fluid, by the Porter-Silber reaction, after the oral administration of prednisolone, triamcinolone, or placebo to 240 normal human subjects. The data clearly demonstrate the homology of serum and parotid fluid 17-OHCS levels through a range of 0.22 micrograms to 57.72 micrograms/100 ml. in serum. Urinary excretion of steroids was highest following prednisolone, intermediate in the placebo group, and lowest after triamcinolone dosage. (Author)

AD-633 268 **Field 6O, 6R**

CFSTI Prices: HC$8.85 MF$2.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.

DRUGS FOR RADIATION PROTECTION,

by L. A. Tiunov, G. A. Vasilev, and E. A. Valdshtein. 17 Feb 66, 587p FTD-TT-65-556 TT 66-61282

Unedited rough draft trans. of mono. Protivoluchevye Sredstva, Moscow, 1964 318p.

Descriptors: (*Radioprotective agents, Medical research), Radiation injuries, Drugs, Radiobiology, Radiological dosage, Radiation effects, Chemical compounds, Medicine, Bibliographies, USSR.

The reference book contains data on more than 1000 preparations described up to 1963. Data published in 'Protivoluchevyye sredstva,' (Drugs for Radiation Protection, pub. 1961), are not repeated. Bibliographical data are compiled at the end of the book; references are listed alphabetically and numbered. The efficiency of the protection (sensibilization) is expressed by the factor of dose variation (FID) which indicates the necessary variation of the radiation dose administered to the subject to be protected in order to achieve the same effect as on irradiation without protection. The structural formulas are given in the form represented by the authors of the references. Structural formulas and synonyma of preparations described in the reference book of 1961 are not given. Because of the great influence of the oxygen effect on the action of drugs for radiation protection, the composition of the gaseous medium during the irradiation is given whenever possible. Absence of such data means that the irradiation was carried out in air. Apart from new preparations, the most important data published before 1961 are mentioned if they were not described previously for some reason.

AD-633 347 **Field 6O, 6S**

CFSTI Prices: HC$1.00 MF$0.50

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.

EFFECTS OF COLD EXPOSURE UPON THE ACTION OF THERAPEUTIC DRUGS: PART II.

Technical rept. no. 2, Nov 64-Nov 65,

by James Y. P. Chen, and H. C. Bergman. Apr 66, 24p SID-65-1626

Contract AF 41 (609)-2683,

Proj. AF-8241,

Task 824102

AAL TR-66-3

Descriptors: (*Chemotherapeutic agents, Cold weather tests), Drugs, Toxicity, Exposure, Effectiveness, Narcotics, Emetics, Antiemetics, Hypnotics ; sedatives, CNS stimulants, Amphetamines, Sulfates, Barbiturates, Tranquilizers, Tolerances (Physiology), Body temperature, Hypothermia, Dosage, Sleep, Inhibition, Behavior, Temperature, Monkeys, Dogs, Rats.

Identifiers: Prochlorperazine, Apomorphine, Meperidine hydrochloride, Dextroamphetamine sulfate.

In rats acutely exposed to cold as compared to room temperature, the toxic responses to parenteral injections of meperidine hydrochloride, of dextroamphetamine sulfate and prochlorperazine ethanesulfonate were invariably greater in cold than at room temperature. With further experiments an even greater increase was noted in the acute oral toxicity of prochlorperazine dimaleate at 4C; the acute oral toxicity of this drug was 144 times greater at 4C than at room temperature. This large difference in toxicity appeared to be an additive effect of the inherent hypothermic action of the drug and of the temperature-lowering action in the cold environment. Tests with larger animals, monkeys and dogs, indicated that the differences in toxicity between the room temperature and cold environments were not as great as in rats. The ability of large animals to retain body heat in the cold for a longer time than rats can may have contributed to the lesser effect. The results with monkeys injected with prochlorperazine in increasing dosage may have revealed the possibility of a tolerance development to the drug. (Author)

AD-633 394 **Field 6O, 6R**

CFSTI Prices: HC$2.00 MF$0.50

Federation of American Societies for Experimental Biology, Washington, D. C. Life Sciences Research Office.

A STUDY OF RESEARCH METHODOLOGY FOR USE IN THE DEVELOPMENT OF ANTI-RADIATION AGENTS,

by Wendell H. Griffith, and Helen M. Dyer. 15 Jan 66, 50p

Contract DA-49-092-ARO-70

Descriptors: (*Radioprotective agents, Medical research), Radiobiology, Radiation injuries, Pharmacology, Toxicity, Chemical compounds, Central nervous system, Gastrointestinal system, Oxygen, Hemopoietic system, Antigens ; antibodies, Tissue culture, Transplantation, Cells (Biology), Tissues (Biology), Mortality rates, Skin, Body weight, Bacteria, Viruses, Enzymes, Radiological dosage, Radiation effects.

Contents: Evaluation of research procedures employed in the screening and development of effective and safe anti-radiation agents; Properties of an ideal anti-radiation agent; Present status of research methodology employed in the search for and development of anti-radiation agents; Nature and general manifestations of radiation damage and protection; Methodology and significance of the mouse screening test and of other procedures employed in the search for anti-radiation agents and in the evaluation of radiation protection potency; Survival of irradiated mice with and without a protective agent; Determination of radiation protection by measurement of intracellular recovery and of the reparative proliferation of tissues; Methods of assessment of radiation protection potency; Chemical, pharmacologic, and toxicologic properties of anti-radiation agents.

AD-632 780 **See Field 6F**

AD-632 874 **See Field 6P**

AD-632 914 **See Field 6P**

6P. PHYSIOLOGY

AD-632 680 **Field 6P**

CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.

COMPARISON OF THREE EXERCISE DEVICES FOR THE ELECTROCARDIOGRAPHIC STRESS TEST.

Research rept.,

by Raphael F. Smith. 2 Nov 64, 17p NSAM-906 NAVMED MR005.13-7004.8

See also AD-619 748.

Descriptors: (*Electrocardiography, Test methods), Exercise, Stress (Physiology), Oxygen consumption, Ergometers, Passenger vehicles, Weight, Military personnel, Heart, Medical examination.

Identifiers: Master two-step test.

The Master two-step test, Harvard step test, and the bicycle ergometer have particular features that are useful in testing different groups of patients. In order to have interchangeability of these tests, it is necessary to determine work loads that are equivalent and to consider the factors that influence physiological stress. This report describes the relationship of net oxygen consumption and external work, and graphs are included from which comparison of the oxygen cost of work tasks can be obtained. The oxygen cost of the double Master test was found to be less than for the lowest practical level of work of the Harvard step test. The 20 steps per minute rate on the Harvard step device was found to be essentially the same as the 150 watt load on the Lanooy ergometer. For the military population with a more uniform, muscular physique, adjusting the exercise load according to weight may introduce variability of stress rather than eliminate it. (Author)

AD-632 690 Field 6P
CFSTI Prices: HC$1.60 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
ABSOLUTE IDENTIFICATION OF MUNSELL HUES UNDER RED ILLUMINATION.
Research memo.,
by Kliem R. Miller. Jul 61, 12p
Task DA-11-27
See also AD-204 214.

Descriptors: (*Colors, Identification), (*Visual perception, Colors), Adaptation (Physiology), Vision, Color vision, Masking, Illumination, Surface properties, Coding.

Nine surface colors which are identifiable on an absolute basis in daylight were viewed under red light. Observers received practice in identifying them by number. Three different neutral gray masks were used to preclude identification on the basis of contrast. It was found that no more than four of these surface colors could be used together for coding under red light when absolute identification is required. Three groupings of four colors each can be used. (Author)

AD-632 820 Field 6P
CFSTI Prices: HC$2.60 MF$0.50
Uppsala Univ. (Sweden).
INFLUENCE OF LOCAL TEMPERATURE CHANGES IN THE PREOPTIC AREA AND ROSTRAL HYPOTHALAMUS ON THE REGULATION OF FOOD AND WATER INTAKE.
Technical note,
by Bengt Andersson and Borje Larsson. 1 Feb 61, 24p TN-2
Contract AF 61 (052)-183
Report on contract: Localized Radio-Lesions.

Descriptors: (*Body temperature, *Ingestion (Physiology)), (*Appetite, Body temperature), Brain, Digestive system, Thalamus, Nerve cells, Dehydration, Cooling, Thirst, Food, Water, Radiation effects, Goats, Sweden.

Identifiers: Anorexia, Aphagia.

Local cooling of the preoptic area and rostral hypothalamus was found to induce eating in the fed goat. When the same animal was dehydrated to the state of aphagia, cooling of this area inhibited the animal's urge to drink and at the same time induced eating. Although in a normal goat feeding practically stops when the rectal temperature exceeds 40C (APPLEMAN and DELOUCHE, 1958), local cooling of the preoptic area and the rostral hypothalamus was found to induce the goat to eat hay with a seemingly good appetite at body temperature above 41C. Warming the same area had the reverse effect. It inhibited eating in the previously hungry animal and at the same time induced the goat to drink large quantities of water. In another goat the preoptic 'heat loss centre' had been permanently inactivated by proton irradiation. This animal became adipsic due to the lesion but was seen to continue to eat hay with a seemingly good appetite at body temperatures above 41C. The anorexic effect of warming the preoptic area thus does not seem to be due to a direct thermal effect on the hypothalamic 'appetite centre'. The results provide direct evidence in favour of BROBECK's (1948) 'thermostatic' theory of the regulation of food intake and justify the further extension of this theory to involve also the regulation of water intake. (Author)

AD-632 853 Field 6P
CFSTI Prices: HC$2.00 MF$0.50
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
FLUID AND SOLUTE SHIFTS ACROSS THE PERITONEAL MEMBRANE.
Technical rept.,
by Donald C. Van Riper. Mar 66, 30 ARL-TR-66-9

Descriptors: (*Peritoneum, Permeability), Osmosis, Fluids, Electrolytes (Physiology), Blood plasma, Body fluids, Glucose, Urea, Potassium, Membranes (Biology), Absorption (Biological), Programming (Computers) Dogs.

Isosmotic solutions of mannitol were injected into the peritoneal cavities of 15 dogs. The volume of remaining fluid was measured at timed intervals after injection. The concentration of electrolytes quickly approached plasma levels, principal fluxes occurring during the first 2 hours. Changes in concentration reflected movement of water from the plasma into the intraperitoneal fluid which increased terminally to an average of 26.8 percent of injected volume. The osmolality of the peritoneal fluid terminally was higher than that of the plasma in all but three of the dogs. A computer method is presented for calculating the rate constants for fluxes of solutes in and out of the peritoneal cavity. (Author)

AD-632 874 Field 6P, 6O
CFSTI Prices: HC$3.00 MF$0.75
Lyon Univ. (France). Laboratoire de Pathologie Experimentale.
LA SUPPRESSION DES DIFFERENTS ETATS DE SOMMEIL (Suppression of Different Sleep States).
Scientific rept.,
by Pierre Vimont-Vicary. 1965, 99p
Grant AF-EOAR-62-67,
Proj. AF-9777,
Task 977701
AFOSR 66-0867
Text in French.

Descriptors: (*Sleep, Inhibition), Physiology, Electroencephalography, Atropine, Enzyme inhibitors, Reserpine, Cats, France.

Identifiers: Sleep deprivation.

Cats with chronically implanted electrodes were selectively deprived of paradoxical sleep for 1-26 days by the swimming pool and electric shock techniques. The 'need for paradoxical sleep' was demonstrated by the progressive diminution of the intervals between attempts to enter this phase. Deprivation of this phase of sleep for more than a week produced somnolence, muscular hypotony, sexual excitement, tachycardia, and a picture resembling hallucinations. At the end of this deprivation there was a selective paradoxical sleep 'rebound,' and up to 60% of the first 6 hours was spent in this phase of sleep. Substances with an inhibitory effect on paradoxical sleep, such as atropine, monoamine oxidase inhibitors, and reserpine, were studied, and the results are discussed in light of a neurohumoral hypothesis of sleep. (Author)

AD-632 891 Field 6P
CFSTI Prices: HC$1.00 MF$0.50
Karolinska Institutet, Stockholm (Sweden).
ULTRASTRUCTURE OF SKELETAL TISSUES.
Technical rept.,
by Diego Carlstrom. 28 Nov 62, 8p
Contract AF 61 (052)-386

Descriptors: (*Bone, X-ray diffraction analysis), (*Teeth, X-ray diffraction analysis), Physical properties, Chemical properties, Optical properties, Crystal structure, Tissues (Biology), Calcium compounds, Salts, Water, Flourides, Sweden.

The three-dimensional arrangement of the apatite crystallites in dental enamel has been determined by a new versatile x-ray diffraction camera. The results obtained served as a basis for the evaluation of the optical properties of this tissue. New aspects on the polarized light image of dental enamel are given. The state of water was investigated by polarized light microscopy. The mode of flouride fixation has also been studied. (Author)

AD-632 914 Field 6P, 6A, 6O
CFSTI Prices: HC$1.60 MF$0.50
Karolinska Institutet, Stockholm (Sweden).
RESEARCH ON DISTRIBUTION OF BIOLOGICALLY ACTIVE COMPOUNDS IN THE BODY.
Technical rept. (final), 1 Jan 60-31 Dec 62,
by U. S. von Euler. 15 Jan 63, 20p
Contract AF 61 (052)-309

Descriptors: (*Amines, Biochemistry), (*Psychotrophic agents, Biochemistry), Neuromuscular transmission, Nerve cells, Cyclostomata, Reserpine, Fishes, Excretion, Parachute jumping, Epinephrine, Autonomic agents, Sweden.

Identifiers: Catecholamines.

Data were acquired concerning release and uptake of catecholamines in isolated adrenergic nerve storage granules and the effect of certain drugs on these processes. A tentative theory on mechanism of adrenergic nerve transmission is presented. Quantitative data are given on distribution of catecholamines in fish. Specific granulated catecholamine containing cells were discovered in Myxine heart. Evidence is given for increased noradrenaline release in rats during cold exposure and its importance for survival. Increased adrenaline release during parachute jumping was demonstrated. A hitherto unknown peripheral synaptic mechanism in vas deferens is described. (Author)

AD-632 946 Field 6P
Siena Univ. (Italy). Istituto di Patologia Medica.
REGISTRAZIONE EXTRACELULLARE DELL' ATTIVITA UNITARIA DIENCEFALICA EVOCATA DA STIMOLI SENSITIVI (Extracellular Registration with Unitized Diencephalic Activity Evoked by Sensitive Stimuli),
by G. Carli, A. Malliani, and P. Rudomin. 14 May 64, 3p
Contract AF 61 (052)-253
Text in Italian.

Descriptors: (*Brain, Electrophysiology), Stimulation, Nervous system, Physiology, Italy.

AD-632 954 Field 6P
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Unit No. 2, Taipei (Taiwan).
SODIUM FLUX AND WATER TRANSPORT IN THE EVERTED RABBIT INTESTINAL SAC,
by Edgar M. Neptune Jr., and Thomas G. Mitchell.2 May 66, 18p NAMRU-2-TR-231
NAVMED MF022.03.07-2005.26

Descriptors: (*Intestines, Semipermeability), (*Electrolytes (Physiology), Semipermeability), Sodium, Ions, Transport properties, Water, Potassium, Cholera, Membranes (Biology), Radioactive isotopes, Time studies, Glucose, pH, Inhibition, Rabbits, Taiwan.

Identifiers: Ion transport.

The everted intestinal sac prepared from adult rabbit ileum has unidirectional fluxes of sodium that can be measured with Na (22) and Na (24). The rates are linear for one hour. The net flux is from mucosa to serosa and the net values are about 10% of unidirectional fluxes (net, approximately 1 micro Eq/cm sq/hr at 37C, pH 8.0, in Ringer phosphate-bicarbonate). In the same experiments, there is also net transport of water from mucosa to serosa. The sacs consume glucose, but glucose does not stimulate sodium or water transport. Raising the initial potassium concentration of 5 mEq/L to 20 mEq/L increases glucose consumption but does not alter sodium and water transport. The net transport of sodium is inhibited by KCN and HgCl2 and the unidirectional fluxes are decreased but not abolished. (Author)

AD-633 010 Field 6P
CFSTI Prices: HC$4.00 MF$0.75
Biotechnology Lab., Univ. of California, Los Angeles.

STUDIES IN SKILLED MYOELECTRIC CONTROL.
Final rept., 1 Dec 64-30 Nov 65,
by John Lyman, Hilde Groth, and Gershon Weltman. Apr 66, 110p UCLA-66-25
Contract AF 33 (616)-1969
AFAL TR-66-83

Descriptors: (*Muscles, Control), (*Electrophysiology, Muscles), Electrocardiography, Bionics, Motor reactions, Operators (Personnel), Learning, Simulators, Targets.

Identifiers: Electromyography.

Myoelectric (EMG) signal spectra were investigated and defined for a variety of conditions including different conditions of effort and fatigue. Cardioelectric (ECG) elimination techniques were investigated. Two experiments with uni-dimensional, graduated myoelectric control simulations were conducted to determine design parameters and human response characteristics. Multi-dimensional myoelectric control experiments were designed on the basis of the results of initial studies. An ancillary study on multi-dimensional control using an electromechanical manipulator was also undertaken. The obtained results indicate that the problem of EMG control is by no means solved. (Author)

AD-633 030 **Field 6P**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
BASIC QUESTIONS OF THE ELECTROPHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM (COLLECTION OF ARTICLES).
21 Feb 66, 248p FTD-MT-65-210
TT 66-61264
Edited machine trans. of mono. Osnovnye Voprosy Elektrofiziologii Tsentralnoi Nervnoi Sistemy, Kiev, 1962 232p.

Descriptors: (*Central nervous system, *Electrophysiology), Nerve cells, Retina, Spinal column, Brain, Electroencephalography, USSR.

Contents: General questions of the electrophysiology of the neuron, by P. G. Kostyuk; Electrophysiology of retina neurons, by A. L. Byzov; Electrophysiology of neurons of the spinal ganglions of frogs, by A. A. Lev; Primary responses of the cortex of the cerebral hemispheres, by A. I. Roytbak; Certain peculiarties of initiated electrical potentials of the cortex of the large hemispheres, by V. V. Artem'yev; Secondary bioelectric reactions of the cortex of the large hemispheres, by K. M. Kullanda; Nature of background rhythmics of the cortex of the large hemispheres, by Ye. N. Sokolov; Certain factors determining changes of phythmics of electroencephalograms, by Yu. G. Kratin; Mechanisms of change of background rhythmics of large hemispheres, by L. A. Novikova.

AD-633 092 **Field 6P, 6E**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
PHYSIOLOGIC CHEMISTRY OF THE HUMAN ORAL SECRETIONS: URIC ACID CONTENT OF PAROTID FLUID COLLECTED WITHOUT EXOGENOUS STIMULATION.
Final rept. Jun 64-Jun 65,
by Ira L. Shannon, and James M. Terry. Mar 66, 20p SAM-TR-66-26
Proj. AF-7753,
Task 775303

Descriptors: (*Saliva, *Uric acid), Mouth, Secretion, Blood serum, Fluid flow, Analysis of variance, Dentistry.

Parotid fluid was collected from 508 systemically healthy young adult males without exogenous stimulation. The uric acid content of this fluid, along with serum from simultaneous blood collections, was determined and correlations were sought with oral health status. Serum uric acid was not related to DMFS or periodontal status. A significant ($P < .01$) positive relationship was found between serum uric acid and parotid fluid uric acid. This relationship held true when parotid fluid uric acid was expressed in either concentration ($r = .398$) or secretion in micrograms per minute ($r = .336$). Neither parotid fluid flow rate nor uric acid content was significantly related to either of the oral health variables. Flow rate was negatively related to parotid fluid uric acid concentration ($r = -.524$) and positively related to the secretion rate for this constituent ($r = .796$). Each of these coefficients was different from zero at the .01 level. (Author)

AD-633 124 **Field 6P**
Brussels Univ. (Belgium).
CENTRAL REGULATORY MECHANISMS INTRODUCTION,
by F. Bremer. 1965, 4p

Descriptors: (*Central nervous system, Physiology), Brain, Reflexes, Nervous system, Motor reactions, Proprioception, Nerve impulses, Electrophysiology, Inhibition, Behavior, Psychophysiology.

AD-633 344 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Boston, Mass. Dept. of Anatomy.
CELL PROLIFERATION KINETICS IN THE TONGUE AND INTESTINAL EPITHELIA OF HIBERNATING DORMICE (GLIS GLIS).
Interim technical rept. 5 Jan-1 Oct 65,
by S. J. Adelstein, C. P. Lyman, and Regina C. O'Brien. Apr 66, 22p
Contract AF 41 (609)-2296,
Proj. AF-8237,
Task 823703
AAL TR-65-16

Descriptors: (*Mitosis, Hibernation), (*Hibernation, Desoxyribonucleic acids), (*Desoxyribonucleic acids, Biosynthesis), Cells (Biology), Tongue, Intestines, Autoradiography, Thymidines, Rodents.

The investigation attempts to define the state of cellular division in epithelial populations of the hibernating dormouse Glis glis and to describe the dynamics of the cells' response to arousal. It was found that during hibernation DNA synthesis occurs at a markedly reduced rate, but the number of epithelial cells synthesizing DNA is the same in both hibernating and active animals. Labeled mitotic figures are not seen for up to 96 hours of continuous hibernation after tritiated thymidine is administered, suggesting there is a block in G2. In hibernation the mitotic index drops and no anaphases or telophases are seen, suggesting presence of an intermitotic block. When animals are aroused, there is a flourishing of mitoses with appearance of anaphases, telophases and labeled mitotic figures indicating that both blocks have been relieved with a partial synchronization of proliferating cells. (Author)

AD-633 346 **Field 6P**
CFSTI Prices: HC$4.00 MF$1.00
Harvard Univ., Cambridge, Mass. Dept. of Biology.
THE BIOLOGY OF RODENT TAILS: A STUDY OF FORM AND FUNCTION.
Technical rept. Jan 63-Feb 64,
by Richard W. Thorington, Jr. Feb 66, 149p
Contract AF 41 (609)-2296,
Proj. AF-8237,
Task 823703
AAL TR-65-8

Descriptors: (*Rodents, Anatomy), (*Body temperature, Blood vessels), (*Adaptation (Physiology), Rodents), Physiology, Blood circulation, Motion, Heat production (Biology), Morphology (Biology).

Identifiers: Tails (Anatomy).

The anatomy of the caudal vascular systems of diverse rodents is described. There is a complex pattern of arterial supply and venous drainage, which is basically the same in rodents as diverse as squirrels, dormice, heteromyids, and cricetids. Variations of this pattern appear to reflect the relative importance of countercurrent heat exchange between arteries and veins of the ventral surface of the tail and to represent different patterns of venous return of blood. Thus the vascular anatomy exhibits thermoregulatory adaptations in addition to adaptations for the efficient supply of blood to and drainage of blood from the tissues of the tail. It is concluded that the morphology of the tails of rodents exhibits complex adaptation to the functions of the tail in thermoregulation and in locomotion. A complex interaction of environmental factors has affected the evolution and the presently observed adaptations of form to function among rodent tails. (Author)

AD-633 362 **Field 6P, 6S**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Medical School.
FORMAL PROGRESS REPORT, OCTOBER 15, 1965 THROUGH JANUARY 14, 1966.
1966 4p
Contract AF-41 (609)-2768

Descriptors: (*Nystagmus, Scientific research), (*Vestibular apparatus, Scientific research), Nervous system, Eye, Physiology, Nerve cells, Neuromuscular transmission, Electrophysiology, Stress (Physiology), Ablation.

ANATOMY: Data on the origin of the efferent system to vestibular sense organs failed to demonstrate an association between destruction of the vestibular nuclei and degeneration of homolateral vesiculated nerve endings on the vestibular sensory hair cells. Study on the ultrastructure of the synapses within the tangential nucleus was completed. ABLATION EXPERIMENTS: Study on importance of the medial longitudinal fasciculus in the transmission of vestibular information to eye muscles consisted in observing disturbances of eye movements after lesious localized at various levels of the fasciculus. STIMULATION EXPERIMENTS: Changes in postural reflexes during electrical stimulation of the modulus in the cat was demonstrated. Nystagmus in the cat was induced by electrical stimulation of the postero-lateral areas of the hypothalamus that may correspond to the central nystagmogenic area described in the rabbit. ELECTROPHYSIOLOGY: Resting activity of 481 single units probably located within the Deiter's nucleus of the cat were recorded on tape. The contribution of the peripheral vestibular sense organs to the resting activity recorded in the vestibular nuclei will be investigated by blocking the sense organs.

AD-633 091 See Field 6E
AD-633 119 See Field 6O
AD-633 168 See Field 6L
AD-633 345 See Field 6S

6Q. PROTECTIVE EQUIPMENT

RL-SA-3682 **Field 6Q, 6I**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Hanford Atomic Products Operation, Richland, Wash.
FACTORS CONCERNING THE USE OF VENTILATED CLOTHING FOR PREVENTION OF HEAT STRAIN,
by D. E. Wisehart, F. E. Adley, W. E. Gill, and D. E. Anderson. 20 Aug 64, 20p CONF-652-3
Contract AT (45-1)-1350
Prepared for presentation at the Annual Meeting of the American Industrial Hygiene Association, Pacific Northwest Section, Richland, Wash., Aug 27-28, 1964.

Descriptors: (*Protective clothing, Cooling), (*Stress (Physiology), Protective clothing).

6R. RADIOBIOLOGY

AD-632 819 **Field 6R**
CFSTI Prices: HC$1.10 MF$0.50
Uppsala Univ. (Sweden).
STUDY ON LOCALIZED RADIOLESIONS IN THE CENTRAL NERVOUS SYSTEM.
Annual summary rept. no. 2, 1 Feb 61-31 Jan 62,
by B. Karlson and B. Larsson. 27 Feb 62, 3p
Contract AF 61 (052)-183

Descriptors: (*Radiation effects, *Central nervous system), Radiation injuries, Brain, Pigeons, Peripheral nervous system, Protons, Morphology (Biology), Ganglia, Spinal cord, Radiological dosage, Ingestion (Physiology), Thalamus, Permeability, Capillaries, Laboratory equipment, Sweden.

AD-633 024 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Naval Radiological Defense Lab., San Francisco, Calif.
AN ESTIMATE OF THE EFFECTS OF FALLOUT BETA RADIATION ON INSECTS AND ASSOCIATED INVERTEBRATES,
by Joseph D. Teresi, and Curtis L. Newcombe. 27 May 66, 93p USNRDL-TR-982
Proj. PS64-200 (50)

Descriptors: (*Beta particles, Radiation effects), (*Insects, Radiation effects), (*Invertebrates, Radiation effects), Metamorphosis, Radioactive fallout, Radiological dosage, Fertility, Mortality rates.

Three practical considerations were found to merit attention in the evaluation of the impact of fallout radiation on the terrestrial insects and associated invertebrates. Firstly, the relatively low dose levels that will affect developmental stages as compared to adult stages; secondly, the lower doses required to produce late mortality as compared to those required for early deaths; and thirdly, the relatively low doses that will cause sterility. The calculated potential beta doses indicated that the dose level expected to sterilize a large majority of the organisms considered in this study would be found in areas bounded approximately by the 50 R/hr at 1 hr gamma contour (4,600 beta rads accumulated in about 5 days) for a 1 MT burst, by the 100 R/hr at 1 hr gamma contour (5200 beta rads in about 5 days) for a 10 MT burst and by the 100 R/hr at 1 hr contour (5200 beta rads in about 14 days) for a 100 MT burst. (Author)

AD-633 201 **Field 6R**
CFSTI Prices: HC$6.00 MF$1.25
Rochester Univ., N. Y. School of Medicine and Dentistry.
FE-59 AND CR-51 STUDIES OF THE EFFECT OF PARTIAL-BODY X-IRRADIATION ON ERYTHROPOIESIS IN BEAGLES.
Doctoral thesis,
by Vincent Thomas Penikas. 1966, 256p
Contract AF 33 (608)-1272

Descriptors: (*Hemopoietic system, Radiation effects), (*X rays, *Erythrocytes), Dogs, Iron, Chromium, Blood plasma, Tracer studies.

In beagle dogs that received partial-body exposures of 1000 kVp X-rays, alterations in erythropoietic activity were studied using Fe-59 as a tracer. Cr-51 was used to estimate erythrocyte life span and the rate of loss of red cells from the circulation following exposure. Three groups of dogs were exposed to 1700 R to the upper-body, one group to 400 R to the upper-body, one group to 400 R to the lower-body, and a sham-irradiated group was used as a control. In an attempt to determine the degree of erythropoietic activity in the irradiated bone marrow during the period of rapid recovery after an upper-body exposure to 1700 R, two groups received an additional exposure of 400 R to either the upper or lower-body 14 days after initial 1700 R exposure. Ferrokinetic data among the various groups were analyzed and compared.

AD-633 203 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Texas A and M Univ., College Station.
VIABILITY OF ADULT RAT SKIN FOLLOWING 13 MEV PROTON IRRADIATION.
Master's th sis,
by Bobby Lamar Caraway. Jan 66, 96p
Contract AF 33 (608)-1284

Descriptors: (*Proton bombardment, Skin), (*Skin, Viability), (*Cancer, Radiation effects), Rats, Cells (Biology), Pathology.

The effects of low energy (13 Mev) protons upon adult rat skin were studied. The study was conducted in three parts. (1) A pathologic study was conducted in which the carcinogenesis of proton irradiation was determined eight months postirradiation. Thirteen groups of ten rats each, which had been irradiated at progressively increasing doses per group (at increments of 100 rad per group) were examined in order that a dose-pathology relationship might be established. (2) A series of pilot experiments were performed to develop a cell culture technique conducive to growth of adult skin cells and to differentiate between the behavior in culture of irradiated cells as opposed to the behavior of nonirradiated cells. (3) A series of experiments were conducted using cells in culture as a method to detect the point in time postirradiation in which irradiated skin cells become carcinomatous. The conclusions from this limited study point out that cell culture techniques may offer a method to detect developing carcinoma cells before neoplastic lesions actually become observable. (Author)

BNL-7859 **Field 6R, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven Natl' Lab., Upton, N. Y.
IMPROVED STRONTIUM AUTORADIOGRAPHY OF MINERALIZED TISSUES WITH INTERNAL CONVERSION AND AUGER ELECTRON EMITTING SR 85,
by Leon Pentel, and Edgar A. Tonna. 1964, 10p
Contract AT (30-2)-GEN-16, Grant NIH-DEO 1847
Prepared in cooperation Murry and Leonie Guggenheim Foundation Inst. for Dental Res. N. Y. Univ., N. Y.

Descriptors: (*Tissues (Biology), Radioactive isotopes), (*Radiobiology, Autoradiography).

LA-3435 **Field 6R, 18D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A DOSE MONITORING INSTRUMENT FOR NEUTRONS FROM THERMAL TO 100 MEV,
by Stephen A. McGuire. Aug 65, 25p
Contract W-7405-eng-36

Descriptors: (*Health physics instrumentation, Radiation monitors), (*Radiation monitors, Radiological dosage).

N66-18318 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
CONDUCT RESEARCH ON THE EFFECT OF VERY STRONG FIELDS AND OF MAGNETIC FIELD FREE ENVIRONMENTS ON MAN AND ANIMALS.
Progress rept. 1 Nov 65-31 Jan 66,
by D. E. Beischer. 1966, 7p
Contract NASA Order-R-39
NASA CR-70632

Descriptors: *Magnetic field, *Animal study, *Magnetic effect, *Mitosis.

ORNL-P-1211 **Field 6R, 6C**
CFSTI Prices: HC$2.00 MF$0.75
Oak Ridge National Lab., Tenn.
THE IMMUNOGENETIC BASIS OF HYBRID RESISTANCE TO PARENTAL MARROW GRAFTS,
by Gustavo Cudkowicz. 1965, 47p CONF-650314-1
Contract W-7405-eng-26
Prepared for presentation at Symposium on Isoantigens and Cell Internations, Philadelphia.

Descriptors: (*Transplantation, Bone marrow), (*Genetics, Radiation effects).

TID-21460 **Field 6R, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana.
THE EFFECT OF X-RAY IRRADIATION ON THE ENZYMATIC ACTIVITY AND NUCLEIC ACID METABOLISM IN SEEDS AND SEEDLINGS OF ZEA MAYS,
by R. H. Hageman. 1964, 19p
Contract AT (11-1)-791

Descriptors: (*Seeds, Radiation effects), (*Radiobiology, Plants (Botany)).

Identifiers: Zea mays.

TID-21679 **Field 6R, 6M**
CFSTI Prices: HC$1.00 MF$0.50
New York Univ., N. Y. Dept. of Radiology.
THE MOLECULAR AND BIOLOGICAL EFFECTS OF RADIOACTIVE PHOSPHORUS AND X-RADIATION ON BACTERIOPHAGE NUCLEIC ACID.
Progress rept. 1 Mar 64-28 Feb 65,
by J. G. Van Dyke. 1965, 25p
Contract AT (30-1)-3220

Descriptors: (*Bacteriophages, Radiation effects), (*Radioactive isotopes, Microbiology).

AD-632 812 **See Field 6C**

AD-633 268 **See Field 6O**

AD-633 348 **See Field 7E**

AD-633 394 **See Field 6O**

ANL-7104 **See Field 18H**

DP-1006 **See Field 18H**

6S. STRESS PHYSIOLOGY

AD-632 696 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
STUDIES OF CIRCADIAN CYCLES IN HUMAN SUBJECTS DURING PROLONGED ISOLATION IN A CONSTANT ENVIRONMENT USING 8-CHANNEL TELEMETRY SYSTEMS.
Memorandum rept.,
by Bruce R. Clegg and Karl E. Schaefer. 10 Feb 66, 13p MR-66-4
NAVMED MR005.14-3300-1.01

Descriptors: (*Rhythm (Biology), Humans), (*Confined environments, Rhythm (Biology)), Telemetering data, Stress (Physiology), Sleep, Body temperature, Closed ecological systems, Space medicine, Respiratory system, Cardiovascular system, Underwater.

Identifiers: Circadian cycles.

The report presents experiences obtained with the use of 8-channel telemetry systems in continuous simultaneous monitoring of six physiological functions (EEG, EKD, respiratory rate, body temperature, skin temperature, BSR) in one or two subjects during isolation experiments of two to three weeks duration. The studies were performed to determine the extent of internal desynchronization in free running circadian cycles of physiological functions, under conditions of confinement in a constant environment such as those encountered in spaceflights and underwater exploration.

AD-632 706 **Field 6S**
CFSTI Prices: HC$1.10 MF$0.50
Gaustad Hospital, Oslo (Norway). EEG Research Lab.
ELECTROENCEPHALOGRAPHIC STUDY OF PILOT STRESSES IN FLIGHT.
Final technical rept.,
by Carl Wilhelm Sem-Jacobsen. 1 Jul 61, 6p
Contract AF 61 (052)-197
AFOSR 1727

Descriptors: (*Electroencephalography, *Pilots), Aviation medicine, Stress (Physiology), Electrocardiography, Flight, Convulsive disorders, Performance (Human), Fatigue (Physiology), Anoxia, Blackout (Physiology), Norway.

The selection and classification by airborne electroencephalography of pilots in high performance aircrafts were carried out. Film-strips of the pilots' reaction were made at the time of a stressful turn and five minutes later, during bombruns at a target range. EEG, ECG and flight patterns recordings were made from take-off to landing; movies, for technical reasons, only for brief periods. The pilots rated as A, with only minimal changes in the airborne EEG test, appeared unaffected on the movie. The B-group has short episodes of high voltage delta-theta-activity in the EEG. The movie revealed an eight seconds convulsion. The pilots in the C category showed major EEG abnormalities. The movie revealed them unconscious for thirty seconds. During the study more than 100 subjects were tested. The study underlines the value of airborne EEG testing as an objective method to evaluate the pilots' ability to act and react when subjected to flight stress and fatigue in the high performance aircrafts and space vehicles. An unknown number of pilots have convulsions during 'black-outs' and brain anoxia, as a secondary response in spite of good 02 supply.

AD-632 817 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa.
HUMAN BIOCHEMICAL PARAMETERS OF ACCELERATIVE STRESS.
Final rept.,
by Elihu York. 13 Apr 66, 20p NADC-MR-6603

Descriptors: (*Acceleration tolerance, Biochemistry), (*Acceleration, Stress (Physiology)), Phospholipids, Blood, Glucose, Blood chemistry, Blackout (Physiology), Epinephrine, Metabolism, Humans.

Identifiers: Greyout (Physiology).

Acceleration stress conditions were imposed on four healthy subjects riding the human centrifuge. Blood biochemical analyses were performed on all subjects, with the demonstration of an increase in blood glucose following centrifugation in three of the four subjects, two of whom developed 'blackout'. All four subjects developed 'greyout'. The changes in blood sugar may suggest a relationship between epinephrine secretion and graduated acceleration stress resulting in physiological changes in the subject. Changes in pooled plasma phospholipid fractions were demonstrated in blood samples obtained before and following acceleration; these changes suggest that acceleration may interfere with intracellular energy transfer mechanisms involving phosphorylated compounds associated with oxidative metabolism. The preliminary results of the pilot project indicate that further biochemical measurements may be desirable in assessing acceleration tolerance in man. (Author)

AD-633 170 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Aeromedical Research Lab. (6571st), Holloman AFB, Tex.
QUANTITATIVE EFFECTS OF ABRUPT DECELERATION ON PULMONARY DIFFUSION IN MAN.
Rept. for 1 Sep 65-1 Feb 66,
by Alan C. Whitehouse, William K. Brown, Peter Foster, and Harris F. Scherer. May 66, 21p
ARL-TR-66-12
Contract NASA-T-1335G

Descriptors: (*Lungs, Diffusion), (*Deceleration, Lungs), Humans, Stress (Physiology), Carbon monoxide, Oxygen consumption.

Pulmonary diffusion capacity was measured in nine subjects using the steady state method to determine if this physiological measurement was altered by impact. Each subject rode the Daisy Decelerator twice backward (+G sub x) at 25 G, twice laterally (-G sub y) at 15 G, and experienced one sham ride. Carbon monoxide diffusion capacities were measured immediately before and after each ride, and 3 and 24 hours afterward. No significant change in pulmonary diffusion capacity was associated with impact. There was no correlation between observed and predicted CO diffusion capacity based on oxygen consumption, however, observed CO diffusion capacity and oxygen consumption were highly correlated. The validity of the prediction formula as described by Donevan et al. is questioned, but this may be related to the increased altitude (4400 ft) at which the studies were done. (Author)

AD-633 345 **Field 6S, 6P**
CFSTI Prices: HC$2.00 MF$0.50
Kentucky Univ., Lexington. Dept. of Physiology and Biophysics.
CALORIGENIC RESPONSE OF WARM- AND COLDADAPTED RABBITS TO INTRAVENOUS INFUSION OF EPINEPHRINE AND NOREPINEPHRINE.
Technical rept. Sep 62-Sep 63,
by William V. Judy. Mar 66, 34p
Contract AF 41 (657)-380,
Proj. AF-8237,
Task 823702
AAL TR-63-15

Descriptors: (*Acclimatization, Amines), (*Amines, Metabolism), (*Adaptation (Physiology), Amines), Epinephrine, Levarterenol, Parenteral infusions, Hypothermia, Body temperature, Oxygen consumption, Respiration, Stress (Physiology), Blood, Glucose, Exposure, Shivering, Rabbits.

Identifiers: Cold tolerance, Catecholamines.

Measurements were made on 16 New Zealand and 8 Dutch breed rabbits to determine the effect of cold acclimation on the calorigenic responsiveness to epinephrine and norepinephrine. Oxygen consumption, colonic temperature, respiratory rate and blood glucose measurements were made before, during and after intravenous infusion of epinephrine (3micrograms/kg/min) and norepinephrine (30micrograms/kg/min). Warm-adapted rabbits (27 ± 1C) showed less increase in colonic temperature and oxygen consumption after infusion of epinephrine and norepinephrine than did cold-adapted rabbits (5 ± 1C). Blood glucose concentration increased equally in both groups after infusion of epinephrine and norepinephrine. Respiratory rate decreased the same in warm- and cold-adapted animals during infusion of norepinephrine and increased after infusion was stopped. In cold-adapted groups I and III norepinephrine infusion increased oxygen consumption 3 and 13 times greater than that of warm-adapted groups I and III. In cold-adapted group II oxygen consumption did not increase notably above that of warm-adapted group II after infusion of norepinephrine. Epinephrine infusion induced an increased oxygen consumption in cold-adapted groups I and II tow and five times greater than that of warm-adapted groups I and II. Cold-adapted group III showed no marked increase in oxygen consumption above that of warm-adapted group III after infusion of epinephrine. (Author)

AD-633 355 **Field 6S, 6K, 6C, 22A**
CFSTI Prices: HC$3.00 MF$0.75
Foreign Technology Div., Wright-Patterson AFB, Ohio.
LITERATURE INDEX OF AEROSPACE MEDICINE AND BIOASTRONAUTICS, PUBLISHED IN USSR (1964-1965),
by L. I. Boreva, and E. M. Zabodovskaya. 18 Mar 66, 68p FTD-TT-65-1661
TT 66-61351
Unedited rough draft trans. of mono. Ukazatel Literatury po Aviakosmicheskoi Meditsine i Bioastronavtike, Izdannoi v SSSR (1964-1965), Moscow, 1965 68p.

Descriptors: (*Space medicine, Indexes), Space biology, Stress (Physiology), Radiobiology, Nervous system, Physiology, Neurology, Nystagmus, Stress (Psychology), Space environmental conditions, Man-machine systems, Space crews, Life support, Astronauts, Training, Weightlessness, Nystagmus, Vestibular apparatus, Electrophysiology, Chlorella, USSR.

N66-15635 **Field 6S**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Huntsville, Ala.
THE HUMAN PARAMETER IN SPACE FLIGHT. A STATE-OF-THE-ART REVIEW,
by M. R. Sharpe Jr. 19 Jul 63, 67p NASA-TM-X-57119, MTP-M-MS-IS-63-1

Descriptors: *Manned space flight, *Physiological response, *Space environment, *Human body, *Man-machine system.

AD-632 996 **See Field 5J**

AD-633 347 **See Field 6O**

AD-633 362 **See Field 6P**

6T. TOXICOLOGY

AD-633 164 **Field 6T**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECTS OF HYDRAZINE ON BLOOD GLUCOSE AND MUSCLE AND LIVER GLYCOGEN IN THE ANESTHETIZED DOG.
Progress rept., Mar-Nov 64,
by Gale D. Taylor. Mar 66, 17p SAM-TR-66-12
Proj. AF-7753,
Task 775301

Descriptors: (*Hydrazine, Toxicity), (*Glucose, Blood), (*Glycogen, Toxicology), Muscles, Liver, Dogs, Anesthesia, Pathology, Tissues (Biology).

Intravenous injection of diluted hydrazine (25 mg./kg.) into anesthetized dogs caused prompt elevation of blood glucose levels, which reached a maximum in about 2 hours and decreased progressively during 4 hours thereafter. Liver glycogen levels fell rapidly during the first 4 hours after injection of hydrazine. Depletion of liver glycogen stores was associated with severe hypoglycemia and some depletion of muscle glycogen. Packed cell volume progressively increased after hydrazine administration. Microscopic examination of liver tissue from treated dogs showed swelling of hepatic cells and apparent fatty infiltration. Sections of liver stained with PAS confirmed the rapid glycogen depletion. It is postulated that hydrazine affects the carbohydrate concentration of various tissues by a primary insult to the glycogenetic-glycogenolytic mechanism of the liver. (Author)

AD-633 091 **See Field 6E**

7A. CHEMICAL ENGINEERING

ANL-7091 **Field 7A, 7D, 18J**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.

THE MASS TRANSFER OF SINGLE, SOLID URANIUM SPHERES TO FLOWING MOLTEN CADMIUM IN LAMINAR AND TURBULENT FLOW,
by E. Dean Traylor. Sep 65, 166p
Contract W-31-109-eng-38

Descriptors: (*Mass transfer, Uranium), (*Liquid metals, Cadmium).

LADC-6297 **Field 7A**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
PROCESSING OF PLUTONIUM BY ION EXCHANGE III. KINETIC AND EQUILIBRIUM PARAMETERS FOR THE CALCULATION OF FIXED-BED COLUMN PERFORMANCE,
by D. B. James, and R. S. Cooper. 1963, 19p
Contract W-7405-eng-36

Descriptors: (*Ion exchange resins, Sorption), (*Plutonium, Purification).

N66-15990 **Field 7A**
CFSTI Prices: HC$2.00 MF$0.50
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
EPITAXIAL PROCESS DEVELOPMENT FOR MONOLITHIC COMPLEMENTARY MOS-FET STRUCTURES WITH P-N JUNCTION ISOLATION.
Final rept. 1 Feb-15 Jul 65,
by G. W. Skouson. 1965, 29p
Contract NAS5-3758
NASA CR-69682

Descriptors: *Epitaxial deposition, *Etching, *P-N Junction, *Silicon.

ORNL-3889 **Field 7A, 7B, 7C, 7D K**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
ANALYTICAL CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING NOVEMBER 15, 1965,
by Helen P. Raaen. Jan 66, 167p
Contract W-7405-eng-26

Descriptors: (*Chemical analysis, Instrumentation), (*Radiochemistry, Scientific research).

ANL-6898 **See Field 18J**

BNWL-173 **See Field 18G**

DP-1004 **See Field 18J**

PB-170 061 **See Field 5C**

PB-170 065 **See Field 5C**

PB-170 190 **See Field 5C**

7B. INORGANIC CHEMISTRY

AD-632 720 **Field 7B, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Pennsalt Chemicals Corp., King of Prussia, Pa. Research and Development Dept.
TITANIUM (IV) CHELATES CONTAINING BINEGATIVE LIGANDS,
Technical rept.,
by G. H. Dahl and B. P. Block. May 66, 11p TR-50
Contract Nonr-2687 (00),
Proj. NR-356-408

Descriptors: (*Titanium compounds, *Chelate compounds), Chemical bonds, Salicylic acids, Organic phosphorus compounds, Alkanes, Oxides.

Identifiers: Pentanediols, Diphenylmethylene diphosphinic acid.

The reaction of titanium (IV) alkoxid in 1:1 stoichiometry with 2-methyl-2,4-pentanediol, pyrocatechol, salicylic acid, or P,P'-diphenylmethylenediphosphinic acid yields chelates of the form Ti (BB) (OR)2, where BB represents the binegative bidentate ligands involved and R ethyl or isopropyl. A similar reaction with 1,3-propanediol does not produce Ti (OC3H6O) (OR)2, but instead Ti (OC3H6O)2 and Ti (OR)4 are recovered. The Ti (BB) (OR)2 derivatives are all associated in solution. Replacement of the alkoxy groups with acetylacetonate groups in the pyrocatecholate derivative gives the monomeric mixed chelate (Ti (o-C6H4O2) (C5H7O2)2). P,P'-Diphenylmethylenediphosphinic acid was prepared via the reaction of diisopropyl phenylphosphonite with methylene iodide. (Author)

AD-632 793 **Field 7B, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Virginia Univ., Charlottesville. Dept. of Chemistry.
STUDIES OF METHYL DERIVATIVES OF 1,2 DICARBA CLOVOPENTABORANE (5).
Technical rept.,
by Russell N. Grimes. 3 May 66, 14p TR-1
Contract Nonr-474 (13)

Descriptors: (*Pentaboranes, Thermal stability), Pyrolysis, Organoboranes, Liquids, Vapors, Chemical reactions, Molecular structure.

Identifiers: Dimethyl dicarba clovopentaboranes, Carboranes.

The thermal stability of C,3-dimethyl-1,2-dicarba clovopentaborane (5) was examined in the liquid and vapor states. Pyrolysis of the liquid at 130C yielded a trimethyl and two tetramethyl derivatives of 1,2-C2B3H5 plus trimethyl boron and nonvolatile solids. The vapor diluted in helium was unreactive at 115C but at 230C partially reacted to give C,5- (CH3)2-1,1-C2B3H3 and C,3,5-(CH3)3-1,2-C2B3H2. No rearrangement of the 1,2- carborane cage structure was observed, and the higher methylated derivatives were more stable than C,3- (CH3)2-1,2-C2B3H3. C,3- (CH3)2-1,2-C2B3H3 reacted with 2,4,6-collidine to produce a red complex. The significance of the stability of the methylated 1,2-C2B3H5 structure is discussed in relation to other experimental and theoretical studies of the carboranes. (Author)

AD-633 392 **Field 7B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
RIAS, Inc., Baltimore, Md.
THEORETICAL AND QUANTUM CHEMISTRY OF N, O, F COMPOUNDS.
Quarterly technical rept. no. 8, 9 Jan-9 Apr 66,
by Joyce J. Kaufman. 9 Apr 66, 7p
Contract DA-31-124-ARO (D)-203, ARPA Order-542,
Proj. AROD-5084-C
See also AD-626 184.

Descriptors: (*Oxidizers, Chemical properties), (*Nitrogen compounds, Molecular orbitals), (*Oxygen compounds, Molecular orbitals), (*Fluorine compounds, Molecular orbitals), (*Molecular orbitals, Oxidizers), Chemical bonds, Theory, Quantum mechanics, Programming (Computers), Specific impulse, Spectra (Infrared), Molecular energy levels.

RIGOROUS LCAO-MO-SCF CALCULATIONS: A new atomic SCF program based on 'combined Gaussian-type orbitals (CGTO)' is being coded. This is to supply many-center molecular SCF programs with basis functions which should enjoy excellent performance competitive with good STO basis functions. SEMI-EMPIRICAL LCAO-MO CALCULATIONS: Disagreement was expressed with the pattern of dissociation energies reported at the meeting of the Working Group in the Thermochemistry of Propulsion Compounds held in Cape Kennedy, Florida. The reason is that investigations for OF or NF compounds show the calculated overlap populations to be in the same order as the experimental bond dissociation energies, with both of them consistent with observed infrared stretching frequencies.

ANL-7123 **Field 7B, 18J, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
GLOVEBOX AMALGAMATION FOR THE DETERMINATION OF OXYGEN IN ALKALI METALS,
by Ben D. Holt. Dec 65, 10p
Contract W-31-109-eng-38

Descriptors: (*Chemical analysis, Laboratory equipment), (*Alkali metals, Oxygen).

LA-3436 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE SOLUBILITIES OF SELECTED ELEMENTS IN LIQUID PLUTONIUM. VII. NIOBIUM,
by D. F. Bowersox, and J. A. Leary. 1 Nov 65, 13p
Contract W-7405-eng-36

Descriptors: (*Liquid metals, Plutonium), (*Niobium, Solubility).

N66-18355 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ELECTRON PARAMAGNETIC RESONANCE OF OXYGEN ON ZN O AND ULTRAVIOLET-IRRADIATED MG O,
by J. P. Jayne and J. H. Lunsford. 13 May 65, 17p
NASA-TM-X-56858

Descriptors: *Electron paramagnetic resonance, *Oxygen, *Magnesium oxide, *Ultraviolet radiation, *Zinc oxide.

RFP-601 **Field 7B**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
THE PYROHYDROLYSIS OF PLUTONIUM TETRAFLUORIDE,
by E. Vejvoda. 17 Dec 65, 24p
Contract AT (29-1)-1106

Descriptors: (*Plutonium compounds, Fluorides), (*Chemical analysis, Fluorine).

AD-632 684 **See Field 19A**

AD-632 723 **See Field 7D**

AD-632 799 **See Field 20F**

AD-632 866 **See Field 7C**

AD-633 105 **See Field 5A**

AD-633 148 **See Field 20L**

AD-633 399 **See Field 19A**

AD-633 454 **See Field 7D**

ANL-7078 **See Field 18D**

ORNL-3889 **See Field 7A**

7C. ORGANIC CHEMISTRY

AD-632 825 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., San Diego, La Jolla. Dept. of Chemistry.
CARBONIUM ION RADICALS AND OXY RADICALS.

Status rept., 1 Aug 64-Apr 65, (Scientific),
by Teddy G. Traylor. 20 Apr 66, 8p
Grant AF-AFOSR-514-641
Proj. 9762,
Task 976202
AFOSR 66-0763

Descriptors: (*Ferrocenes, Substitution reactions), (*Peroxides, Decomposition), (*Free radicals, Chemical reactions), Dienes, Resonance, Molecular structure, Chlorides, Viscosity, Esters, Metalorganic compounds.

The study concerns the comparison of ferrocenylmethyl derivatives (chlorides mostly) with benzyl derivatives with respect to unimolecular and bimolecular nucleophilic substitution. A quantitative comparison is found which allows the conclusion that the extreme reactivity of the former systems derives from the cyclopentadienide structure and not from the iron (See AD-624 364). Resonance stabilization by the cyclopentadienide moiety accounts for the reactivity and an elimination process accounts for the fact that the leaving anion and the iron assume a trans arrangement in the ionization of ferrocenylmethyl chloride or other derivatives. In addition, a study of the effect of viscosity on the chain length of radical induced decomposition of hydroperoxides has shown that the chain carrying process is diffusion of alkoxyl radicals (RO.) from a solvent cage containing (2RO.) and the chain termination is merely collapse of these radicals to ROOR within the cage. (Author)

AD-632 866 **Field 7C, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Virginia Univ., Charlottesville. Dept. of Chemistry.
TRICARBAHEXABORANE.
Technical rept.,
by Christopher L. Bramlett and Russell N. Grimes. 12 May 66, 8p TR-2
Contract Nonr-474 (13)

Descriptors: (*Boranes, Chemical properties), (*Organoboranes, Chemical properties), Alkynes, Chemical reactions, Vapors, Chemical analysis, Molecular structure, Spectrum (Infrared), Mass spectrum.

Identifiers: Carboranes, Methyl carboranes, Tricarba hexaboranes.

Thre major volatile products from the room temperature vapor-phase reaction of tetraborane (10) and acetylene were isolated and structurally characterized. These compounds were identified as C-methyl derivatives of tricarbahexaborane (7), which is the first three-carbon carborane to be reported. A fourth product is believed to be the parent compound, C3B3H7, for which the structure 2,3,4-tricarbahexaborane (7) is proposed.

AD-633 328 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Boston Univ., Mass. Dept. of Chemistry.
NON-DEGRADATIVE AND OTHER REACTIONS OF ACTIVE NITROGEN WITH ORGANIC SUBSTRATES.
Final rept., 1 Sep 61-31 Jan 66,
by Norman N. Lichtin. 31 May 66, 5p
Grant DA-ARO (D)-31-124-G171,
Proj. CRD-AA-IP-3193C
AROD 3193:3
See also AD-631 107.

Descriptors: (*Nitrogen, Chemical reactions), Organic nitrogen compounds, Dienes, Synthesis (Chemistry), Degradation, Butadienes, Propenes, Isoprene, Glow discharges, Carbon compounds, Radioactive isotopes, Gas chromatography, Spectra (Infrared), Chemical bonds.

The reaction in the gas phase of active nitrogen produced by 245OMc microwave-supported glow discharge with two types of organic substrate was investigated. One part of the research involved the reaction with conjugated dienes. The major aspect of this part was devoted to determination of the dependence of yields of seventeen different products as a function of the reaction parameters, ratio of reactants, total pressure, concentration of reactants and rate of linear transport. Kinetic analysis of these data provided insight into the mechanism of action of active nitrogen. The products of reaction of active nitrogen with isoprene under a single set of conditions were also investigated. The second part of the research involved investigation of the reaction of 14C-labelled propylene with active nitrogen. Attention was directed to the activity present in propylene recovered after reaction with a large excess of active nitrogen. Both total activity and the activity at C-1 were determined.

AD-284 779 **See Field 11A**

AD-447 062 **See Field 11J**

AD-632 720 **See Field 7B**

AD-632 793 **See Field 7B**

AD-632 799 **See Field 20F**

AD-633 058 **See Field 11J**

AD-633 068 **See Field 11H**

AD-633 105 **See Field 5A**

AD-633 169 **See Field 7D**

AD-633 276 **See Field 20L**

ORNL-3889 **See Field 7A**

PB-169 542 **See Field 7E**

7D. PHYSICAL CHEMISTRY

ACF-5 **Field 7D, 9B, 12B**
CFSTI Prices: HC$2.00 MF$0.50
ACF Industries, Inc., Albuquerque, N. Mex.
AN ANALYTICAL CHEMISTRY EVALUATION--MACHINE HANDLING OF ANALYTICAL DATA,
by J. D. Allen. 12 Mar 65, 37p ACF-413-233
Contract AT (29-1)-1352

Descriptors: (*Chemical analysis, Programming (Computers)), (*Analog-to-digital converters, Mathematical models).

AD-632 685 **Field 7D, 20M**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
REACTION RATE CONSTANTS FROM CROSS SECTIONS.
Technical information series,
by M. H. Bortner. Feb 66, 33p R66SD14
Contract DA-49-146-XZ-497

Descriptors: (*Reaction kinetics, Probability), Thermodynamics, Statistical distributions, Kinetic energy.

The use of reaction rate constants to calculate changes in chemical composition usually is involved in systems having a Boltzmann kinetic energy distribution. Since many data for such reactions are obtained on monoenergetic systems, it is necessary to convert such data to the more useable form. Equations for such conversions are developed in this report. General expressions requiring graphical integrations to obtain rate constants are first obtained. Some specific relations between cross section and energy are used and integrated expression are then obtained which, when applicable, give analytical expressions for rate constants, Any of the expressions are applicable only to the exact states for which the data were obtained. (Author)

AD-632 723 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Little (Arthur D.) Inc., Cambridge, Mass.
THE STRUCTURAL FORMS OF LIQUID WATER AT INTERFACES AND NEAR BIOPOLYMERS.
Technical rept.,
by R. A. Horne. 31 May 66, 10p TR-22
Contract Nonr-4424 (00),
Proj. NR-051-460

Descriptors: (*Water, *Molecular association), Surfaces, Polymers, Solutions, Molecular structure, Viscosity, Surface tension, Chemical bonds.

Liquid water consists of 'free' water and two structural forms. The first of these forms constitutes the Frank-Wen clusters and the hydration atmospheres of ions whereas the second form, which is much more stable with respect to hydrostatic pressure, is present in small amounts in the bulk water but is the principle form at interfaces and near hydrophobic molecules or parts of molecules. (Author)

AD-632 755 **Field 7D, 21B, 20M, 20D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Research Lab., Schenectady, N. Y.
DENSITY INDUCTION TIMES BEHIND SHOCK WAVES IN VERY LEAN MIXTURES OF D2, H2, C2H2 AND C2H4 WITH O2.
Scientific rept.,
by D. R. White. Dec 65, 36p 65-RL-3943C
Contract AF 33 (657)-7945,
Proj. AF-7023,
Task 702307
ARL 65-274

Descriptors: (*Heat of activation, Fuels), Shock waves, Ignition, Deuterium, Hydrogen, Alkynes, Ethylenes, Density, Mixtures, Oxygen, Thermochemistry.

The induction time for shock wave-induced exothermic reaction in lean O2-D2, O2-H2, O2-C2H2, and O2-C2H4 mixtures was measured in the constant area shock tube using optical interferometry. For fuel/oxygen ratios of a few per cent and for $1100 < T < 2200K$, the gas time from the shock to the first decrease in density is given in moles/liter, seconds, and degrees K. All fuels show essentially the same activation energy (approx. 17.3 kcal/mole); and with respect to H2, the induction times for D2, C2H2, and C2H4 are about 1.5, 0.5, and 0.4, respectively. The more nearly stoichiometric mixtures show induction times inversely proportional to the geometric mean reactant concentration, and the dependence on the fuel concentration increases with decreasing fuel/O2 ratio, the dependence on (O2) vanishing for the leanest O2-C2H4 mixtures. The vibrationally relaxed but unreacted density is always attained prior to exothermic reaction, and changing the relation time with respect to the induction time has no effect on the latter within the data scatter. (Author)

AD-632 850 **Field 7D, 20H**
CFSTI Prices: HC$1.00 MF$0.50
New York Univ., N. Y. Dept. of Physics.
ATOM BEAM STUDIES NO. 3.
Final rept., 1 May 65-30 Apr 66,
by Benjamin Bederson. 30 Apr 66, 9p
Grant DA-ARO (D)-31-124-G631,
Proj. 3521-P
AROD 3521:7

Descriptors: (*Molecular beams, Polarization), (*Electrons, Scattering), Spectrum analyzers, Oxygen, Mercury, Potassium, Atomic energy levels, Hyperfine structure.

Brief summaries are given of work on electron scattering by atomic oxygen, beam measurements of the polarizability of metastable mercury, and electron-potassium interactions.

AD-632 896 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y. Dept. of Chemistry.

DOUBLE LAYER IMPEDANCE OF ELECTRODES WITH CHARGE TRANSFER REACTION.
Technical rept.,
by Paul Delahay, and Gilles G. Susbielles. Apr 66, 26p TR-1
Contract Nonr-285 (65),
Task RR001-01-01

Descriptors: (*Electrodes, Oxidation-reduction reactions), (*Electrical double layer, Electrical impedance), Mercury alloys, Equations, Resistance (Electrical), Capacitance, Thermodynamics, Tellurium alloys, Ions.

Equations for the electrode impedance are derived for metal-ion amalgam electrodes and other electrode reactions without a priori separation of faradaic and double layer charging processes. Experimental conditions for electrode impedance measurements are re-examined with some emphasis on Sluyters's method for separation of the double layer capacity. Results are derived for metal-ion amalgam electrodes, and other types of electrode reactions are discussed.

AD-632 965 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
General Dynamics/Fort Worth, Tex. Nuclear Aerospace Research Facility.
EXCITATION OF HYDROGEN CYANIDE, METHYL CYANIDE, ETHYL CYANIDE, AND BUTADIENE BY LOW-ENERGY ELECTRON IMPACT.
Technical rept. for 1 Oct 64-30 Sep 65,
by C. R. Bowman. May 66, 24p FZK-281
Contract AF 29 (601)-6643,
Proj. AF-6773,
Task 677302
AFWL TR-66-37

Descriptors: (*Cyanides, Excitation), (*Nitriles, Excitation), (*Butadienes, Excitation), Electron bombardment, Spectroscopy, Spectra (Visible + ultraviolet), Alkynes, Acetonitriles.

Identifiers: Hydrocyanic acid, Ethyl cyanides.

The excitation spectra of hydrogen cyanide, methyl cyanide, ethyl cyanide, and butadiene were measured by the trapped electron technique. These spectra are compared with ultraviolet absorption data where possible and with the excitation spectra of isoelectronic molecules of the acetylene series. (Author)

AD-633 169 **Field 7D, 7C, 6L, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
INTERFACIAL POLYMERIZATION OF N-ALKYL ALPHA CYANOACRYLATE HOMOLOGS.
Technical rept.,
by Fred Leonard, John A. Collins, and Harold J. Porter. Apr 66, 15p TR-6605
Proj. DA-3A013001A91C

Descriptors: (*Acrylic resins, Polymerization), (*Nitriles, Polymerization), Surface properties, Reaction kinetics, Catalysis, Tissues (Biology), Adhesives, Films, Blood.

Identifiers: Cyanoacrylates, Polycyanoacrylates.

The normal alkyl - 2 - cyanoacrylates from methyl through n-octyl exhibit a reverse order of polymerization rate on biological substrates than on water. On water, the lower homologs spread and polymerize rapidly, whereas the higher homologs spread but polymerize slowly. On biological substrates, the lower homologs do not spread or spread slightly, and the higher homologs exhibit large spreadabilities and very rapid polymerization rates. Determination of the spreading coefficients for these systems using the monomers or model compounds confirm the observed spreadabilities. It is proposed that the increased rate of polymerization of the higher homologs on biological substrates may be due to increased catalyst concentrations on these surfaces or to the solubilization of the higher homologs at the interface, making the catalyst sites more available to the monomer. The suggestion is made that if the liquid monomers spread and orient on the substrate and subsequently polymerize, the polymers will maintain the orientation. (Author)

AD-633 305 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
RCA Labs., Princeton, N. J.
TRACE ANALYSIS OF SOLIDS BY MASS SPECTROMETRY.
Interim rept. 1 Apr 65-31 Mar 66,
by Richard E. Honig. Apr 66, 31p Scientific-1
Contract AF 19 (628)-5106,
Proj. AF-4608,
Task 460802
AFCRL 66-322

Descriptors: (*Mass spectroscopy, Metals), Spectrum analyzers, Analysis, Solids, Films, Germanium, Line spectrum.

The report covers work done to improve the performance of a mass spectrograph in the semi-quantitative analysis of solids. Reproducibility and accuracy were found to be limited by many instrumental factors, as well as sample inhomogeneity. A broad-based evaluation of highest-purity materials, to be used as compacting powders or counterelectrodes, has led to at least one source which can supply gold of adequate purity. The design and construction of a short-pulse ion source was finished which is of particular value in surface studies. Ionsensitive thin-film plates were developed which show marked improvements in line sharpness, halation, signal-to-noise ratio, and vacuum characteristics. (Author)

AD-633 454 **Field 7D, 7B**
Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
THERMODYNAMIC STABILITIES OF H4B4O4 (g) AND H4B6O7- (g),
by Suresh K. Gupta, and Richard F. Porter.7 Oct 65, 4p
Contract DA-31-124-ARO (D)-320
AROD 4890:6

Descriptors: (*Boron compounds, Thermal stability) Boranes, Oxides, Thermochemistry, Enthalpy, Heat of formation, Mass spectrum, Molecular structure, Vapors.

The molecular species H4B4O4 and H4B6O7 were identified mass spectrometrically as products of high-temperature reactions in the H-B-O system. For the reactions 4/3H3B3O3 (g) = H4B4O4 (g) and H4B4O4 (g) + B2O3 (1) = H4B6O7 (g), enthalpy at 1200K = -2.5 plus or minus 2.0 and -0.9 plus or minus 2.0 kcal/mole, respectively. Heats of formation of H4B4O4 (g) and H4B6O7 (g) are -392 plus or minus 4 kcal/mole at 298K and -691 plus or minus 5 kcal/mole at 1200K, respectively. (Author)

NYO-2024-8 **Field 7D, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Dept. of Physics.
RADIATION DAMAGE STUDIES IN SOLIDS USING THE TECHNIQUES OF ELECTRON-SPIN PARAMAGNETIC RESONANCE AND NUCLEAR MAGNETIC RESONANCE.
Annual progress rept. 1 May 64-30 Apr 65,
by P. J. Bray. 16 Feb 65, 49p
Contract AT (30-1)-2024

Descriptors: (*Radiation damage, Electron spin resonance), (*Nuclear magnetic resonance,Radiation damage).

N66-15421 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SELECTIVE ELECTROPLATING OF ETCHED CIRCUITS,
by H. Herzig and C. E. Whitfield, Sr. 1964, 7p
NASA TM-X-54974

Descriptors: *Circuit board, *Copper, *Gold plate, *Thin film, *Electroplating, *Photoresistivity.

N66-17478 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C.
SURVEY OF THERMODYNAMIC PROPERTIES OF THE COMPOUNDS OF THE ELEMENTS CHNOPS.
Preliminary rept. no. 6, 1 Oct -31 Dec 65,
by G. T. Armstrong, M. K. Buresh, G. T. Furukawa, andM. L. Reilly. 1 Feb 66, 22p NBS-9043
Contract NASA Order-R-138
NASA CR-70464

Descriptors: *Ammonia, *Methane, *Vapor pressure, *Carbon dioxide, *Heat capacity.

N66-18371 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
STUDY OF CO RADICALS ON MAGNESIUM OXIDE WITH ELECTRON PARAMAGNETIC RESONANCE TECHNIQUES,
by J. P. Jayne and J. H. Lunsford. 16 Mar 65, 19p
NASA-TM-X-56313

Descriptors: *Magnesium oxide, *Radical, *Carbon monoxide, *Electron paramagnetic resonance.

ORNL-TR-490 **Field 7D, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
RELATIONSHIP BETWEEN THE ELECTRICAL PROPERTIES OF IONIC COMPOUNDS OF GROUP II ELEMENTS AND THE ENERGY OF INTERACTION IONS IN A CRYSTALLINE LATTICE,
by A. P. Nakhodnova. 1956, 15p
Translated from IZV. Tomsk. Politekhn. Inst., V 91 209-18 (1956).

Descriptors: (*Alkaline earth metals, Halogen compounds), (*Alkaline earth oxides, Electrical properties).

TID-19978 **Field 7D, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Allison Div., General Motors Corp., Indianapolis, Ind.
SURVEY OF APPLICABLE ELECTROCHEMICAL TECHNOLOGY. OPERATIONAL AND FABRICATION TECHNIQUES AND MATERIALS. ENERGY DEPOT ELECTROLYSIS SYSTEM STUDY.
Dec 63, 19p ERD-3687, v. 1
Contract AT (30-1)-3101

Descriptors: (*Electrolytic cells, Corrosion inhibition), (*Corrosion, Electrochemistry).

TID-20451 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
IDENTIFICATION OF ANIONIC COMPLEXES IN AQUEOUS SOLUTION BY SOLVENT EXTRACTION USING LONG-CHAIN AMINES,
by A.S. Kertes, P. J. Lloyd, and K. Kimura.3 Apr 64, 7p
Contract AT (30-1)-905

Descriptors: (*Molecular association, Amines), (*Amines, Solvent extraction).

UCRL-16472 **Field 7D, 14B**
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
MEASUREMENT OF HEAT RELEASED ON SOLID SURFACES,
by Rolf H. Muller, and Louis B. Nobbe. Dec 65, 39p
Contract W-7405-eng-48

Descriptors: (*Surface temperatures, Measuring devices (Electrical ; electronic)), (*Temperature sensitive elements, Thermochemistry).

AD-632 673 See Field 20B

AD-632 695 See Field 20D

AD-632 729 See Field 9A

AD-632 762 See Field 5A

AD-632 807 See Field 20J

AD-633 050 See Field 11F

AD-633 051 See Field 20B

AD-633 318 See Field 8J

AD-633 392 See Field 7B

AD-633 399 See Field 19A

AD-633 414 See Field 19A

ANL-6943 See Field 20B

ANL-7091 See Field 7A

CEND-508 See Field 11F

COO-1319-12 See Field 11F

COO-1319-15 See Field 11F

LA-3399 See Field 18J

ORNL-3889 See Field 7A

PB-169 690 See Field 14B

7E. RADIO AND RADIATION CHEMISTRY

AD-632 666 **Field 7E, 11I**
CFSTI Prices: HC$2.00 MF$0.50
General Dynamics, Fort Worth, Tex. Nuclear Aerospace Research Facility.
X-IRRADIATION OF NORMAL SATURATED HYDROCARBONS.
Technical rept., 1 Oct 64-30 Sep 64,
by T. W. Albrecht and P. R. Cheever. May 66, 34p FZK-272
Contract AF 29 (601)-6643,
Proj. AF-6773,
Task 677302
AFWL TR-66-3

Descriptors: (*Hydrocarbons, *Radiation chemistry), (*Polyethylene plastics, Radiation damage), Aliphatic compounds, Alkenes, X rays, Infrared spectroscopy, Films, Chemical bonds, Hydrogen, Low-temperature research, Paramagnetic resonance, Free radicals, Ethylenes, Methane, Ionization.

Identifiers: Octacosanes.

The development of trans-vinylene in X-irradiated octacosane and Marlex 6002 polyethylene films was measured by means of the infrared spectrometer. Initial development of the trans-vinylene in the octacosane films at temperatures of 137K, 229K, and 289K had a G-value of 2.1 plus or minus 0.4 bonds formed per 100 ev, with decay of the trans-vinylene being most rapid at the highest temperature. Hydrogen evolution from X-irradiated films of these same materials was measured by means of the mass spectrometer. The evolution showed a decrease as the temperature of the irradiation was decreased below 194.5K, with practically no hydrogen liberation at liquid-nitrogen temperature. When the cold irradiated films were slowly warmed, they released a burst of hydrogen at approximately 194.5K. The amount of hydrogen liberated in the burst was dependent upon the irradiation temperature and the irradiating time. EPR (Electron Paramagnetic Resonance) spectra of the free radicals in irradiated Marlex 6002 polyethylene were predominantly of seven lines centered at g = 2.003 and spanning 120 gauss. (Author)

AD-632 704 **Field 7E**
CFSTI Prices: HC$6.00 MF$1.25
Imperial Coll. of Science and Technology, London (England). Nuclear Technology Lab.
RADIATION CHEMISTRY OF ALKYL HALIDES.
Doctoral thesis,
by C. Capellos. Jan 65, 249p
Contract AF 61 (052)-456
ARL 65-157

Descriptors: (*Halogenated hydrocarbons, *Radiation chemistry), Iodine compounds, Hydrogen compounds, Iodides, Iodine, Peroxides, Complex compounds, Absorption spectrum, Oxygen, Solvents, Reaction kinetics, Great Britain.

Alkyl iodides and their mixtures were irradiated with CO60 gamma rays. Hydrogen iodide and iodine formation was measured as a function of dose for deaerated liquid and solid alkyl iodides and their mixtures. G-values for hydroperoxide formation in aerated alkyl iodides were measured and evidence was found for dialkyl peroxide formation in aerated alkyl iodides. Absorption spectra of the charge transfer complexes IR1 formed in the pulse radiolysis of alkyl iodides, were measured and molar extinction coefficients and rate constants for the decay of IR1 were obtained. The effect of oxygen and iodine on the formation and constant of decay of IR1 was studied. Pulse radiolysis studies of alkyl iodides indicated that the decomposition of solute is larger than that expected on the basis of energy directly absorbed by the solute.

AD-633 348 **Field 7E, 6R**
CFSTI Prices: HC$5.00 MF$1.00
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CHEMICAL DOSIMETRY OF IONIZING RADIATIONS,
by A. M. Kabakchi, Ya. I. Lavrentovich, and V. V. Penkovskii. 15 Mar 66, 168p FTD-TT-65-420
TT 66-61339
Unedited rough draft trans. of mono. Khimicheskaya Dozimetriya Ioniziruyushchikh Izluchenii, Izd-vo Akademiya Nauk Ukrainskoi SSR, Kiev, 1963, p1-76, 86-92, 105-35.

Descriptors: (*Radiation chemistry, *Radiological Dosage), Health physics instrumentation, Test methods, Solutions, Gels, Sulfates, Iron compounds, Cerium, Benzene, Dyes, Nitrogen compounds, Oxides, Glass, Crystals, Electrochemistry.

This volume generalizes the theoretical and experimental material that has been accumulated during recent years in the field of chemical dosimetry. Attention is focused on the justification for the use of chemical-dosimetry methods to solve problems that are difficult or impossible to solve by other methods (measurement of absorbed dose in joules per kilogram, separate determination of the doses of several types of radiation acting simultaneously on the medium, measurement of large doses, and the like). The book sets forth in detail the technique of determining size of dose by chemical methods in the solution of various practical problems. (Author)

ANL-7025 **Field 7E**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
CRITICAL TEMPERATURES AND DENSITIES OF THE ALKALI METALS,
by Ira G. Dillon, P. A. Nelson, and B. S. Swanson. Aug 65, 67p
Contract W-31-109-eng-38

Descriptors: (*Alkali metals, Density), (*Radioactive isotopes, Alkali metals).

BMI-1753 **Field 7E, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
RADIATION-INDUCED FORMATION OF ORGANO-METALLIC COMPOUNDS WITH PARTICULAR EMPHASIS ON ORGANOTINS,
by Allison F. Fentiman Jr., Robert E. Wyant, James L. McFarling, E. Jack Kahler, and John F. Kircher. 3 Jan 66, 21p
Contract W-7405-eng-92

Descriptors: (*Metalorganic compounds, Radiation chemistry), (*Tin compounds, Radiation chemistry).

BNWL-159 **Field 7E, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
DETERMINATION OF 232 U AND U 233 IN IRRADIATED THORIUM,
by M. R. Weller, and W. Y. Matsumoto. Nov 65, 24p
Contract AT (45-1)-1830

Descriptors: (*Thorium, Radioactive isotopes), (*Uranium, Separation).

NYO-2915-1 **Field 7E, 18H**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Coll. of Engineering.
HYDROCARBON REACTIONS FROM FISSION-FRAGMENT IRRADIATION.
Final rept.,
by Wallis A. Lloyd. 15 Nov 64, 12p
Contract AT (30-1)-2915

Descriptors: (*Hydrocarbons, Fission), (*Radiation chemistry, Hydrocarbons).

ORO-634 **Field 7E**
CFSTI Prices: HC$2.00 MF$0.50
North Carolina State Univ., Raleigh. Dept. of Textile Chemistry.
RADIATION-INDUCED OXIDATION OF HYDROCARBONS,
by Arthur A. Armstrong Jr., and William K. Walsh. 15 Jul 65, 39p
Contract AT (40-1)-3210

Descriptors: (*Radiation chemistry, Hydrocarbons), (*Hydrocarbons, Oxidation).

PB-169 542 **Field 7E, 6A, 7C**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
SYNTHESE DE LA DL-METHIONINE CARBOXYLE 14C ET SA RESOLUTION ENZYMATIQUE EN L-METHIONINE CARBOXYLE 14C (Synthesis of DL-Methionine Carboxyl 14C and Its Enzymatic Optical Resolution into L-Methionine Carboxyl 14C),
by Jean-Pierre Guermont, David Sharefkin, and Louis Pichat. Mar 66, 14p CEA-R-2989
Text in French; Attached Summary in English.

Descriptors: (*Labeled substances, Methionine), (*Methionine, Synthesis (Chemistry)), (*Moleular rotation, Methionine), Molecular isomerism, Carboxylic acids, Separation, Enzymes, France.

DL-methionine carboxyl C14 was prepared by the Strecker reaction from C14 N K and beta-methylmercaptopropionaldehyde with a 61 per cent yield. The enzymatic resolution of N-acetyl DL-methionine gives rise to L-methionine carboxyl C14 with a 78 per cent yield. (Author)

RFP-438 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., DOW Chemical Co., Golden, Colo.
TECHNIQUES FOR C-H ANALYSIS ON RADIOACTIVELY CONTAMINATED MATERIALS,
by Otis H. Willoughby Jr. 1964, 2p
Contract AT (29-1)-1106

Descriptors: (*Radioactive isotopes, Handling), (*Organic materials, Contamination).

RRL-152 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Mellon Inst., Pittsburgh, Pa. Radiation Research Labs.
QUARTERLY REPORT, OCTOBER 1, 1964-DECEMBER 31, 1964. FUNDAMENTAL RESEARCH NO. 6041.
11 Jan 65, 8p NYO-2310-5, RRL-152
Contract AT (30-1)-2310

Descriptors: (*Radiation chemistry, Reports).

TID-21486 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Univ., Amherst. Polymer Research Inst.
SOME STUDIES OF CRYSTAL ORIENTATION IN IRRADIATED POLYMERS.
Annual rept. 1 Jan-31 Dec 64,
by Richard S. Stein. 31 Dec 64, 13p
Contract AT (30-1)-3003

Descriptors: (*Radiation chemistry, Polymers), (*Polymers, Crystallography).

TID-21576 **Field 7E**
CFSTI Prices: HC$2.00 MF$0.50
Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
EXPERIMENTAL EFFECTS OF PILE RADIATION ON PURE FLUOROCARBONS,
by T. M. Reed and J. C. Mailen. 1 Jun 63, 35p
Contract AT (40-1)-2846

Descriptors: (*Halogenated hydrocarbons, Radioactive isotopes), (*Radioactive isotopes, Cobalt).

TID-21590 **Field 7E**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Noyes Lab. of Chemistry.
EFFECTS OF POST-IRRADIATION TREATMENT OF THE PRODUCT SPECTRUM OF THE 14 N%N, P C 14 REACTION IN AMMONIUM CHLORIDE,
by Peter E. Yankwich, and Pierre J. Marteney. 1963, 30p SM-57/82
Contract AT (11-1)-1142

Descriptors: (*Radiation chemistry, Ammonium compounds), (*Ammonium compounds, Chlorides).

BNWL-178 **See Field 18J**

BNWL-180 **See Field 18G**

ORNL-3889 **See Field 7A**

PB-169 538 **See Field 18J**

8A. BIOLOGICAL OCEANOGRAPHY

AD-632 739 **Field 8A**
CFSTI Prices: HC$1.00 MF$0.50
Directorate of Scientific Information Services, Ottawa (Ontario).
QUANTITATIVE DISTRIBUTION AND SEASONAL DYNAMICS OF ZOOPLANKTON IN THE NEWFOUNDLAND AREA,
by E. V. Vladimirskaya. Apr 66, 9p T-452-R TT 66-61247
Trans. of Okeanologicheskie Issledovaniya (USSR) n13 p137-42 1965.

Descriptors: (*Plankton, *Atlantic Ocean), Newfoundland (Province), Marine biology, Ocean currents, Ecology, Climatology, USSR.

The material for the present communication was supplied by the plankton collections made during the IGY by the research ship Mikhail Lomonosov (2nd, 4th, 7th and 11th voyages) and by the expeditionary vessel Sevastopol (14th voyage). The plankton was collected with a small Juday net made of 38 silk gauze, at standard horizons from depths 500 or 1000 m to the surface. The quantitative analysis of the zooplankton was carried out by a method developed in VNIRO (All-Union Scientific Institute for Marine Fishing and Oceanography).

AD-632 710 **See Field 8C**

AD-632 757 **See Field 8C**

AD-632 768 **See Field 8C**

AD-632 769 **See Field 8C**

AD-632 841 **See Field 8C**

PB-170 201 **See Field 5C**

8B. CARTOGRAPHY

AD-633 047 **Field 8B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
COMPUTER PROGRAM FOR THE 'SINGLE MODEL ORIENTATION' CASE OF THE GENERAL PROBLEM OF PHOTOGRAMMETRY.
Memorandum rept.,
by Lila M. Butler. Oct 65, 99p BRL-MR-1704
Proj. RDT/E-1L013001A91A

Descriptors: (*Photogrammetry, *Programming (Computers)), Aerial photography, Stereoscopic photography, Geodesics, Cameras, Position finding.

This report presents an electronic computer program for the analytical solution of the 'Single Model Orientation' problem, based on the theory documented in BRL Report No. 1065 (PB-145 274). The most recent developments of the analytical solution for the general problem of photogrammetry, as developed by H. H. Schmid, are included in this program. The program will solve single model orientations under all conditions. (Author)

N66-17345 **Field 8B**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y.
SOME APPLICATIONS OF RADAR RETURN DATA TO THE STUDY OF TERRESTRIAL AND OCEANIC PHENOMENA,
by W. J. Pierson, Jr., B. B. Scheps, and D. S. Simonett. 1965, 43p
Contracts NsR-17-004-003, Nonr-285 (57)
NASA CR-70387

Descriptors: *Geophysics, *Oceanography, *Side -looking radar, *Spacecraft sensor, *Mapping.

AD-632 776 **See Field 8E**

AD-633 031 **See Field 3A**

AD-633 033 **See Field 3B**

8C. DYNAMIC OCEANOGRAPHY

AD-632 710 **Field 8C, 8A, 8J**
CFSTI Prices: HC$5.00 MF$1.25
Washington Univ., Seattle. Dept. of Oceanography.
PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY - OCTOBER 1962. VOLUME I. BROWN BEAR CRUISE 299; 23 JANUARY - 7 FEBRUARY.
Technical rept.,
by C. M. Love. Aug 65, 199p TR-119, Ref-M65-30
Contracts Nonr-477 (37), Nonr-477 (10),
Proj. NR-083-012

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), (*Estuaries, Washington (State)), Seacoast, Oregon, Marine biology, Physical properties, Chemical properties, Tables, Oceanographic vessels.

Identifiers: Columbia River, Brown Bear Cruise 299.

This report contains tabulated physical, chemical, and biological data collected during Cruise 299 of the Research Vessel Brown Bear during the months of January -- February 1962 in an area with 120 miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific. (Author)

AD-632 757 **Field 8C, 8A, 8J**
CFSTI Prices: HC$6.00 MF$1.50
Washington Univ., Seattle. Dept. of Oceanography.
PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY - OCTOBER 1962. VOLUME V. BROWN BEAR CRUISE 312: 14 SEPTEMBER - 18 OCTOBER.
Technical rept.,
by C. M. Love. Aug 65, 275p TR-119, Ref-M65-34
Contracts Nonr-477 (10), Nonr-477 (37),
Proj. NR-083-012
See also AD-632 710.

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), (*Estuaries, Washington (State)), Rivers, Seacoast, Oregon, Marine biology, Physical properties, Chemical properties, Tables, Oceanographic vessels.

Identifiers: Columbia River, Brown Bear Cruise.

This report contains physical, chemical, and biological data collected during Cruise 312 of the Research Vessel Brown Bear during the months of September - October 1962 in an area within 300 miles of the coasts of Washington, Oregon, and northern California. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific. (Author)

AD-632 768 **Field 8C, 8A, 8J**
CFSTI Prices: HC$6.00 MF$1.50
Washington Univ., Seattle. Dept. of Oceanography.

PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY - OCTOBER 1962. VOLUME III. BROWN BEAR CRUISE 308: 7-19 JUNE. BROWN BEAR CRUISE 310: 10-23 JULY. BROWN BEAR CRUISE 311 24 JULY-14 AUGUST.
Technical rept. for Jan-Oct 62,
by Cuthbert M. Love. Aug 65, 275p TR-119, Ref-M65-32
Contracts Nonr-477 (10), Nonr-477 (37),
Proj. NR-083-012
See also AD-632 757.

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), (*Estuaries, Washington (State)), Rivers, Seacoast, Oregon, Marine biology, Physical properties, Chemical properties, Tables, Oceanographic vessels.

Identifiers: Columbia River, Brown Bear Cruise.

This report contains physical, chemical, and biological data collected during Cruises 308, 310, and 311 of the Research Vessel Brown Bear during the months of June - August 1962 in an area within 360 miles of the coasts of Washington, Oregon, and northern California. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific. (Author)

AD-632 769 **Field 8C, 8A, 8J**
CFSTI Prices: HC$5.00 MF$1.25
Washington Univ., Seattle. Dept. of Oceanography.
PHYSICAL, CHEMICAL, AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY - OCTOBER 1962. COLUME IV. BROWN BEAR CRUISE 309: 20 JUNE - 9 JULY,
Technical rept. for Jan - Oct 62,
by Cuthbert M. Love. Aug 65, 200p TR-119, Ref-M65-33
Contracts Nonr-477 (10), Nonr-477 (37),
Proj. NR-083-012
See also AD-632 768.

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), (*Estuaries, Washington (State)), Rivers, Seacoast, Oregon, Marine biology, Physical properties, Chemical properties, Tables, Oceanographic vessels.

Identifiers: Columbia River, Brown Bear Cruise.

This report contains physical, chemical, and biological data collected during Cruise 309 of the Research Vessel Brown, Bear during the months of June - July 1962 in an area within 220 miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific. (Author)

AD-632 841 **Field 8C, 8A, 8J**
CFSTI Prices: HC$5.00 MF$1.00
Washington Univ., Seattle. Dept. of Oceanography.
PHYSICAL, CHEMICAL AND BIOLOGICAL DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, JANUARY-OCTOBER 1962. VOLUME II. BROWN BEAR CRUISE 304: 27 MARCH-12 APRIL.
Technical rept.,
by C. M. Love. Aug 65, 195p TR-119, Ref-M65-31-Pt-2
Contracts Nonr-477 (10), Nonr-477 (37),
Proj. NR-083 012
See also AD-632 768.

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), (*Estuaries, Washington (State)), Oregon, Seacoast, Rivers, Drainage, Oceans, Marine biology, Physical properties, Chemical properties, Oceanographic vessels.

Identifiers: Brown Bear Cruise, Columbia River.

This report contains tabulated physical, chemical, and biological data collected during Cruise 304 of the Research Vessel Brown Bear during the months of March - April 1962 in an area within 150 miles of the coasts of Washington and Oregon. These data were collected as part of a year-round study which has as its objective the determination of the gross features of the movement and dispersion of Columbia River effluent water in the northeast Pacific. (Author)

AD-632 849 **Field 8C, 20D**
CFSTI Prices: HC$3.00 MF$0.75
National Engineering Science Co., Pasadena, Calif.
WAVE SHOALING,
by R. C. Y. Koh and B. J. LeMehaute. 15 Jan 66, 70p Rept. no. SN-134-9
Contract Nonr-4177 (00)

Descriptors: (*Ocean waves, Seacoast), (*Hydrodynamics, Ocean waves), Water waves, Tidewater, Beaches, Fluid mechanics.

Identifiers: Wave shoaling.

This study is a contribution to a larger project for studying the 'Modification of Wave Spectra on the Continental Shelf and in the Surf Zone.' Prior to dealing with a wave spectrum, a study of nonlinear effects on periodic waves appears to be necessary. For this purpose it is assumed that both friction effects and reflection effects are small. Then the principle of conservation of energy flux is applied to a periodic wave. This calculation has already been applied to a Stokes wave (periodic irrotational) to a third order of approximation (Le Mehaute and Webb, 1964). The purpose of this report is to perform the calculation up to the fifth order and to compare the corresponding result, with the third and first order of approximation. It will be the purpose of another (pending) report to present the limits of the principle of conservation of energy flux and to present a method of calculation which takes also into account bottom friction and reflection effect as well as nonlinear effects consistently. (Author)

AD-632 851 **Field 8C, 20D**
CFSTI Prices: HC$3.00 MF$0.75
National Engineering Science Co., Pasadena, Calif.
ON THE BREAKING OF WAVES ARRIVING AT AN ANGLE TO THE SHORE.
Final rept.,
by B. J. LeMehaute and R. C. Y. Koh. 15 Feb 66, 86p Rept. no. SN-134-10

Descriptors: (*Water waves, Beaches), (*Hydrodynamics, Water waves), Lake waves, Ocean waves, Ocean currents, Seacoast, Fluid mechanics.

By using the method of conservation of energy flux between wave orthogonals, the breaking wave characteristics are obtained for waves traveling obliquely to the bottom contours of a straight shoreline. The results of the calculations are presented in the form of nomographs by using the linear and third order irrotational gravity wave theories. Three different breaking criteria are used in these calculations. In particular, a new breaking criterion is proposed for waves breaking on a gentle slope. Some calculations are also performed at the fifth order of approximation and the results compared with the linear and third order cases. (Author)

AD-633 087 **Field 8C, 8J, 14B, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
RESEARCH IN THE OCEAN 33rd TRIP OF VI. TYAZ,
by O. A. Kuznetsov. 1966, 5p Trans-1034
TT 66-61268
Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v64 p154-7 1964.

Descriptors: (*Buoys, Oceanographic equipment), (*Oceanology, USSR), Oceanographic vessels, Marine engineering, Environmental tests, Black Sea, Indian Ocean.

Identifiers: Vityaz.

The development and improvement of gradient measurements from a semi-automatic buoy is reported.

8E. GEODESY

AD-458 817 **Field 8E**
CFSTI Price: HC$1.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
RESONANT GEODESY.
Technical memo.,
by S. M. Yionoulis. Dec 64, 20p TG-633
Contract NOw-62-0604-c

Descriptors: (*Geodesics, Resonance), Satellites (Artificial), Satellite attitude, Special functions (Mathematical), Least squares method, Doppler tracking systems, Tracking, Harmonic analysis, Potential theory.

A preliminary investigation has been made to determine the importance of those harmonics in the expansion of the geopotential which yield near-resonant contributions in satellite tracking residuals. (Author)

AD-632 776 **Field 8E, 8I**
CFSTI Prices: HC$5.00 MF$1.00
Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
PRODUCT IMPROVEMENT TEST REPORT OF ASTRONOMIC SURVEYING EQUIPMENT.
Final rept. May 62-Feb 65,
by Peter J. Cervarich. Mar 66, 169p Rept. no. 28-TR
Proj. DA-1S643315D57801

Descriptors: (*Astronomical geodesics, Instrumentation), (*Surveying, Instrumentation), (*Position finding, Astronomical geodesics), Theodolites, Electronic equipment, Chronographs, Time signals, Radio receivers, Data recording systems, Programming (Computers), Army research.

This report covers the Product Improvement Tests of the following items: (1) 60 degrees Pendulum Astrolabe with Electronic-Transit Detector; (2) Strip Chart Data Recorder; (3) Electronic Chronometer; (4) Radio Time-Standard Receiver; and (5) Computer Programs for Astronomic Problems. Also included is a preliminary test report on the Kern DKM-3A Theodolite. The objective of this task was to re-examine the current astronomic position determination sets and to modernize and update these sets. This report concludes with a suggested equipment set for the field determination of astronomic latitude, astronomic longitude, and astronomic azimuth. (Author)

AD-633 006 **Field 8E, 22**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
POSITION OF McMURDO SOUND, ANTARCTICA TRACKING STATION AS DETERMINED BY ARTIFICIAL EARTH SATELLITES.
Technical memo.,
by F. T. Heuring. Jul 65, 16p TG-714
Contract NOw-62-0604-c

Descriptors: (*Satellite tracking systems, Antarctic regions), (*Position finding, Antarctic regions), (*Astronomical geodesics, Satellite tracking systems), Doppler systems, Tracking, Orbital trajectories, Satellites (Artificial).

Identifiers: McMurdo Station.

During the Antarctic summer (1964-1965) a doppler tracking station, under cognizance of the United States Antarctic Research Program, National Science Foundation, was installed at McMurdo Sound, Antarctica with equipment furnished by the U. S. Navy. Initial station coordinates were acquired by taking an average value from various sources. Since there are no known triangulation or Hiran ties from Antarctica to any existing datum in the world, it was expected that the coordinates were probably in error with respect to the APL Reference System (Heuring, 1964). This was soon verified after some passes of data were processed by our tracking programs. Herein are described the method and results of refining the position of the McMurdo Sound Doppler Tracking Site. (Author)

AD-633 403 **Field 8E**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
CONCERNING THE DERIVATION AND INVESTIGATION OF STOKES' FORMULA,
by V. V. Brovar. May 66, 9p TC-1038
TT 66-61369
O Vyvode i Issledovanii Formuly Stoksa, trans. of Moskovskii Institut Inzhenerov Geodezii, Aerofotosemki i Kartografii. Trudy (USSR) v33 P15-8 1958.

Descriptors: (*Potential theory, *Geodesics), Integral equations, Astronomical geodesics, Boundary value problems, USSR.

Identifiers: Stokes' formula.

AD-633 404 **Field 8E**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
COMPUTATION OF THE FIRST AND SECOND VERTICAL DERIVATIVES OF GRAVITY FROM THE MAPS OF GRAVITY ANOMALIES,
by M. I. Yurkina. May 66, 19p TC-1026
TT 66-61370
Vychislenie Pervoi i Vtoroi Vertikalnykh Proizvodnykh Sily Tyazhesti po Kartam ee Anomaliy, trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Geodezii, Aerosemki i Kartografii. Trudy. (USSR) v157 p116-24 1965.

Descriptors: (*Geodesics, *Gravity), Geophysics, USSR.

Identifiers: Gravity anomalies.

On the basis of the solution proposed by Molodenskiy for his integral equation of density of a single layer on the physical surface of the Earth (the said layer being substituted for the attraction of all the anomolous masses in the interior of the Earth), expressions for determining the second vertical derivatives of the disturbing potential were obtained. (Author)

AD-633 405 **Field 8E**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
EVALUATION ON THE EARTH'S MODEL OF THE PRECISION OF NUMEROV'S FORMULA FOR THE VERTICAL GRADIENT OF GRAVITY,
by M. P. Ignatova. May 66, 17p TC-1027
TT 66-61371
Otsenka Tochnosti Formuly Numerova dlya Vertikalnogo Gradienta Sily Tyazhesti na Modelyakh Zemli, trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Geodezii. Aerosemki i Kartografii. Trudy. (USSR) v157 p125-34 1965.

Descriptors: (*Geodesics, *Gravity), Earth models, Geophysics, USSR.

Identifiers: Gravity anomalies.

Existing methods of computation of the vertical gradient making use of gravity anomalies, under assumption that these anomalies are being observed on a plane surface, are investigated. In reality, however, terrain is never perfectly flat. The influence of inclinations of the terrain was estimated with the help of Earth's models in the form of a truncated cone, a cone with a rounded - off apex, and a ravine of infinite extension. The case was also investigated when the anomalies created by a point mass are given on an inclined plane surface. Errors of the vertical gradient value reach several tens per cent. (Author)

AD-633 407 **Field 8E, 8G**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
GRAVIMETRIC INVESTIGATION OF THE STRUCTURE OF THE EARTH'S CRUST ALONG THE LINE AKHALKALAKI-MIZUR-STEPNOY (CAUCASUS).
by B. K. Balavadze, and G. Sh. Shengelaya. May 66, 15p TC-1015
TT 66-61373
Gravimetricheskoe Issledovanie Stroeniya Zemnoi Kory po Linii Akhalkalaki-Mizur-Stepnoi (Kavkaz), trans. of Sovetskaya Geologiya (USSR) v8 n12 p93-9 1965.

Descriptors: (*Geophysical prospecting, *Gravity), (*Geodesics, Gravity), Geophysics, Structural geology, USSR.

Identifiers: Gravity anomalies.

AD-633 409 **Field 8E**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
ON THE QUESTION CONCERNING THE STUDY OF THE FIGURE OF THE GEOID BY A GRAVIMETRIC METHOD,
by I. F. Monin. May 66, 17p TC-1020
TT 66-61375
K Voprosu Issledovaniya Figury Geoida Gravimetricheskim Sposobom, trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geofizicheskaya, n2 p38-45 1952.

Descriptors: (*Earth, Configuration), Gravity, Geodesics, USSR.

This article points out the well-known difficulties in the selection of a formula for the normal force of gravity in the investigation of the earth's figure. Migalya's formula is presented, permitting us to investigate the figure of the earth by a gravimetric method and enabling us to avoid the difficulties. This formula is being investigated. (Author)

N66-18440 **Field 8E**
CFSTI Prices: HC$2.00 MF$0.50
Centre National de Recherches de L'Espace, Brussels (Belgium).
LOW AND VERY LOW LEVEL DC AMPLIFIERS. PART IV-A MODULATED DC AMPLIFIER FOR MICROVOLT SIGNALS,
by P. Ville. Jun 64, 49p

Descriptors: *Direct current (dc), *Amplifier design, *Airborne equipment.

AD-633 271 **See Field 8N**

AD-633 406 **See Field 22C**

PB-170 196 **See Field 5C**

8F. GEOGRAPHY

AD-633 108 **Field 8F, 8G**
CFSTI Prices: HC$4.00 MF$1.00
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
INDIAN OCEAN STUDIES. PART I. PHYSICAL GEOGRAPHY RECONNAISSANCE: LAS BELA COASTAL PLAIN, WEST PAKISTAN.
Technical rept.,
by Rodman E. Snead. 1 Apr 66, 130p Contrib-66-1, TR-15
Contracts Nonr-1575 (00), Nonr-1575 (03), Proj. NR-388-002

Descriptors: (*Pakistan, *Geography), Seacoast, Indian Ocean, Climatology, Plant (Botany), Terrain, Animals, Ecology, Geology.

Identifiers: West Pakistan, Las Bela Coastal Plain.

A geomorphologic description and physical changes which occurred during the Quaternary in the Las Bela Valley form the basis of this study. A climatically arid region, broken occassionally by winter and summer rainfall, has resulted with barren landscapes covered only with sparse xerophytic vegetation. Vegetation zonation delineates areas of Recent alluvium and beaches from older dunes, gravel fans, and foothills. Enormous sand dunes deposited by southwest winds dominate the east side of the central plain. Crustal displacement associated with Alpine-Himalayan geosynclinal movement has resulted in uplifted alluvium which form terraces 10 feet high in the central plain; tilting of the windblown Pleistocene sands in the east; and faults across the Recent beach ridges. Raised oyster beds, barnacles, and wave cut benches are evidence that the sea has invaded the area in past times. The growth of coastal sand spits, changes in the position of mangrove growth in the lagoon, and retreat of the present coast attest to changing environments produced by deposition of the Windar River and wave activity from the sea. (Author)

AD-632 864 **See Field 8H**

AD-632 878 **See Field 4B**

AD-633 120 **See Field 8M**

AD-633 149 **See Field 5K**

AD-633 188 **See Field 5D**

AD-633 337 **See Field 5C**

PB-169 749 **See Field 5C**

PB-169 751 **See Field 5C**

PB-169 786 **See Field 5C**

PB-169 795 **See Field 5C**

PB-170 008 **See Field 5C**

PB-170 014 **See Field 5C**

PB-170 015 **See Field 5C**

PB-170 019 **See Field 5C**

PB-170 020 **See Field 5C**

PB-170 023 **See Field 5C**

PB-170 025 **See Field 5C**

PB-170 026 **See Field 5C**

PB-170 028 **See Field 5C**

PB-170 032 **See Field 5C**

PB-170 037 **See Field 5C**

PB-170 038 **See Field 5C**

PB-170 040 **See Field 5C**

PB-170 042 **See Field 5C**

PB-170 044 **See Field 5C**

PB-170 046 See Field 5C
PB-170 047 See Field 5C
PB-170 050 See Field 5C
PB-170 054 See Field 5C
PB-170 055 See Field 5C
PB-170 056 See Field 5C
PB-170 058 See Field 5C
PB-170 059 See Field 5C
PB-170 061 See Field 5C
PB-170 062 See Field 5C
PB-170 065 See Field 5C
PB-170 066 See Field 5C
PB-170 067 See Field 5C
PB-170 068 See Field 5C
PB-170 069 See Field 5C
PB-170 070 See Field 5C
PB-170 071 See Field 5C
PB-170 072 See Field 5C
PB-170 073 See Field 5C
PB-170 074 See Field 5C
PB-170 075 See Field 5C
PB-170 076 See Field 5C
PB-170 079 See Field 5C
PB-170 080 See Field 5C
PB-170 082 See Field 5C
PB-170 083 See Field 5C
PB-170 084 See Field 5C
PB-170 086 See Field 5C
PB-170 087 See Field 5C
PB-170 088 See Field 5C
PB-170 090 See Field 5C
PB-170 093 See Field 5C
PB-170 094 See Field 5C
PB-170 095 See Field 5C
PB-170 096 See Field 5C
PB-170 097 See Field 5C
PB-170 099 See Field 5C
PB-170 100 See Field 5C
PB-170 101 See Field 5C
PB-170 103 See Field 5C
PB-170 104 See Field 5C
PB-170 105 See Field 5C
PB-170 106 See Field 5C
PB-170 108 See Field 5C
PB-170 109 See Field 5C
PB-170 110 See Field 5C
PB-170 112 See Field 5C
PB-170 113 See Field 5C
PB-170 114 See Field 5C
PB-170 115 See Field 5C
PB-170 117 See Field 5C
PB-170 118 See Field 5C
PB-170 119 See Field 5C
PB-170 120 See Field 5C
PB-170 121 See Field 5C
PB-170 122 See Field 5C
PB-170 124 See Field 5C
PB-170 125 See Field 5C
PB-170 127 See Field 5C
PB-170 128 See Field 5C
PB-170 130 See Field 5C
PB-170 131 See Field 5C
PB-170 132 See Field 5C
PB-170 134 See Field 5C
PB-170 135 See Field 5C
PB-170 136 See Field 5C
PB-170 138 See Field 5C
PB-170 139 See Field 5C
PB-170 140 See Field 5C
PB-170 141 See Field 5C
PB-170 142 See Field 5C
PB-170 144 See Field 5C
PB-170 145 See Field 5C
PB-170 146 See Field 5C
PB-170 147 See Field 5C
PB-170 148 See Field 5C
PB-170 150 See Field 5C
PB-170 153 See Field 5C
PB-170 154 See Field 5C
PB-170 155 See Field 5C
PB-170 156 See Field 5C
PB-170 157 See Field 5C
PB-170 158 See Field 5C
PB-170 159 See Field 5C
PB-170 160 See Field 5C
PB-170 161 See Field 5C
PB-170 163 See Field 5C
PB-170 164 See Field 5C
PB-170 165 See Field 5C
PB-170 166 See Field 5C
PB-170 168 See Field 5C
PB-170 169 See Field 5C
PB-170 170 See Field 5C
PB-170 171 See Field 5C
PB-170 172 See Field 5C
PB-170 173 See Field 5C
PB-170 174 See Field 5C
PB-170 175 See Field 5C
PB-170 179 See Field 5C
PB-170 180 See Field 5C
PB-170 182 See Field 5C
PB-170 183 See Field 5C
PB-170 184 See Field 5C
PB-170 185 See Field 5C
PB-170 186 See Field 5C
PB-170 187 See Field 5C
PB-170 188 See Field 5C
PB-170 190 See Field 5C
PB-170 191 See Field 5C
PB-170 194 See Field 5C
PB-170 195 See Field 5C
PB-170 197 See Field 5C
PB-170 198 See Field 5C
PB-170 199 See Field 5C
PB-170 216 See Field 5C
PB-170 223 See Field 5C
PB-170 224 See Field 5C
PB-170 225 See Field 5C
PB-170 226 See Field 5C
PB-170 262 See Field 5C
PB-170 267 See Field 5C
PB-170 269 See Field 5C
PB-170 289 See Field 5C
PB-170 294 See Field 5C
PB-170 304 See Field 5C
PB-170 305 See Field 5C
PB-170 309 See Field 5C
PB-170 341 See Field 5C
PB-170 522 See Field 5C
PB-170 525 See Field 5C
PB-170 526 See Field 5C
PB-170 527 See Field 5C

8G. GEOLOGY AND MINEROLOGY

AD-632 674 Field 8G, 12A
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.

AN INTEGRAL EQUATION OF THE INVERSE PROBLEM OF ELECTRICAL PROSPECTING,
by A. A. Chudinova. 1966, 11p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1M543312D-416
AERDL T-1839-66, TT 66-61241
Integralnoe Uravnenie Obratnoyi Sadachi Electrorasvedki, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Matematika (USSR) n6 (49) p150-5 1965.

Descriptors: (*Geophysical prospecting, Potential theory), (*Integral equations, Potential theory), Electric fields, USSR.

AD-633 121 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Iowa Engineering Experiment Station, Ames.
DEPTH STUDIES OF WISCONSIN LOESS IN SOUTHWESTERN IOWA: IV. SHEAR STRENGTH.
Technical rept.,
by N. S. Fox, R. A. Lohnes, and R. L. Handy.
1966, 12p TR-2, Contrib-66-3
Contract Nonr-4868 (01),
Projs. NR-389-144, 580-S

Descriptors: (*Engineering geology, *Iowa), Soils, Shear stresses, Internal friction, Well logging, Geology, Soil mechanics.

Identifiers: Loess soil.

This paper discusses the variation of the Coulomb shear strength parameters, cohesive shear strength, and angle of internal friction in the loess in a cut located in N. W. 1/4 Sec. 3, T77N, R44W, Harrison County, Iowa.

AD-633 306 **Field 8G, 8N**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
ON THE MAGNETOTELLURIC METHOD OF INVESTIGATION OF THE UPPER PORTION OF THE EARTH'S CRUST,
by N. P. Vladimirov. 1966, 6p Translation-1000-a
TT 66-61299
Trans. of mono. O Magnito Tellurichеskom Metode Issledovaniya Verkhnei Chasti Zemnoi Kory, Leningrad, 1963 p118-23.

Descriptors: (*Geophysical prospecting, *Telluric currents), (*Terrestrial magnetism, Geophysical prospecting), Probes, Lithosphere, Geophysics, Exploration, USSR.

Identifiers: Magneto-telluric methods.

AD-633 321 **Field 8G, 8N**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
CERTAIN RESULTS OF AEROELECTROPROSPECTING BY THE METHOD OF A ROTATING MAGNETIC FIELD,
by Yu. B. Shaub. 1966, 9p Translation-1000-c
TT 66-61321
Trans. of mono. Nekotorye Pezultaty Aeroelektrorazvedochnykh Rabot Metodom Vrashchayushchegosya Magnitnogo Polya, Leningrad. 1963 p178-85.

Descriptors: (*Geophysical prospecting, *Terrestrial magnetism), Airplanes, Airborne, Measuring devices (Electrical ; Electronic), Magnetic fields, Rotation, Geophysics, USSR.

AD-633 408 **Field 8G**
CFSTI Prices: HC$2.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
CERTAIN REGIONAL PROPERTIES OF THE ABYSSAL STRUCTURE OF THE EARTH'S CRUST IN THE TERRITORY OF THE USSR IN THE LIGHT OF GEOPHYSICAL DATA,
by E. E. Fotiadi, G. K. Karataev, and I. S. Moiseenko. May 66, 25p TC-1016
TT 66-61374
Nekotorye Regionalnye Osobennosti Glubinnogo Stroeniya Zemnoi Kory Territorii SSSR v Svete Geofizicheskikh Dannykh, trans. of Geologiya i Geofizika (USSR) n10 p12-22 1965.

Descriptors: (*Geophysical prospecting, USSR), (*Stratigraphy, USSR), (*Structural geology, USSR), Geodesics, Gravity, Terrestrial magnetism, Seismology.

The results of correlation of large features of the earth crust stratification on the territory of the USSR obtained on the basis of inerpretetion of the complex of regional geophysical data with elements of pre-Neogene and post-Neogene tectonic structure are briefly discussed in the paper. It is found that the thickness of the earth crust as a whole and the thickness of basalt layer are clearly related to Neogene-Quarternary structure, and the thickness of granite layer furthermore reveals the connection with pre-Cenozoic structure and with the history of its development as well. The draft of density heterogenity with the upper mantle is discussed. Manifestation of isostasy for large territories are clearly evident. The authors insist on the fact that the processes of basification play an essential part in the development of the earth crust. (Author)

N66-18381 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
PROGRESSIVE CONTACT METAMORPHISM OF THE BIWABIK IRON FORMATION ON THE MESABI RANGE, MINNESOTA,
by B. M. French. 1965, 9p NASA-TM-X-56376
Presented at the Inst. of Lake Super. Geol., St. Paul, May 6-8, 1965.

Descriptors: *Iron ore, *Mineralogy, *Metamorphism.

RME-4569 (Rev.) **Field 8G**
CFSTI Prices: HC$2.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
URANIUM EXPLORATION IN CHILE,
by Paul H. Knowles, William A. Bowes, Mario Serrano C., Erik Klohn H., and Rodolfo Gruenwald S. Dec 62, 45p

Descriptors: (*Uranium, Chile). (*Chile, Exploration).

TID-21592 **Field 8G**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Reclamation, Denver, Colo. Office of Assistant Commissioner and Chief Engineer.
TRIAXIAL COMPRESSION TESTS OF SALT ROCK CORES FOR THE UNITED STATES ATOMIC ENERGY COMMISSION.
29 Oct 62, 68p Laboratory rept. no. C-1043
Project Dribble.

Descriptors: (*Rock salt, Compressive properties), (*Loading (Mechanics), Rock salt).

Identifiers: Dribble project.

AD-632 799 **See Field 20F**

AD-633 108 **See Field 8F**

AD-633 148 **See Field 20L**

AD-633 407 **See Field 8E**

PB-170 050 **See Field 5C**

PB-170 067 **See Field 5C**

PB-170 072 **See Field 5C**

PB-170 120 **See Field 5C**

8H. HYDROLOGY AND LIMNOLOGY

AD-632 864 **Field 8H, 8F, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
THE NATION'S WATER WEALTH. THE WATER BALANCE AND ITS TRANSFORMATION,
by A. M. Grien and N. N. Dreyer. 1966, 12;
Translation-975
TT 66-61259
Trans. of Priroda (USSR) n5 p36-43 1963.

Descriptors: (*Water supplies, USSR), (*Natural resoures, USSR), (*Hydrology, USSR), Economics, Geography.

Development of a scientifically sound plan for the complex utilization and conservation of the water resources of the Soviet Union is discussed.

AD-632 987 **See Field 8L**

PB-170 044 **See Field 5C**

PB-170 112 **See Field 5C**

PB-170 157 **See Field 5C**

PB-170 186 **See Field 5C**

8I. MINING ENGINEERING

PB-170 050 **See Field 5C**

PB-170 054 **See Field 5C**

PB-170 066 **See Field 5C**

PB-170 067 **See Field 5C**

PB-170 072 **See Field 5C**

PB-170 113 **See Field 5C**

PB-170 117 **See Field 5C**

PB-170 120 **See Field 5C**

PB-170 130 **See Field 5C**

PB-170 134 **See Field 5C**

PB-170 147 **See Field 5C**

PB-170 148 **See Field 5C**

PB-170 150 **See Field 5C**

PB-170 151 **See Field 5C**

PB-170 170 **See Field 5C**

PB-170 190 **See Field 5C**

PB-170 199 **See Field 5C**

PB-170 226 **See Field 5C**

8J. PHYSICAL OCEANOGRAPHY

AD-633 318 **Field 8J, 7D**
CFSTI Prices: HC$1.10 MF$0.50
Department of the Navy, Washington, D. C.
PRESENT STATE AND PROSPECTS FOR DEVELOPMENT OF MARINE CHEMISTRY,
by S. V. Bruevich. 1966, 7p Translation-1010
TT 66-61301
Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v26 p3-7 1958.

Descriptors: (*Oceanology, Chemistry), (*Physical chemistry, Oceanology), Sea water, Biochemistry, Marine biology, Hydrology, Oceans, Seas, Radioactive isotopes, Sedimentation, Atmosphere, USSR.

Activity occurring in the following fields is reviewed: Physical chemistry of sea water; chemical bases of the biological productivity of the seas; joint research in hydrology and hydrochemistry; geochemical studies of hydrogen, phosphorus, silicon, iron, manganese, and carbon dioxide; research in the various regions of the seas and oceans; methods of research; chemistry of marine bottom sediments; and chemistry of the atmosphere and study of chemical exchange with the ocean.

AD-633 424 **Field 8J**
CFSTI Prices: HC$6.00 MF$1.25
Texas A and M Univ., College Station. Dept. of Oceanography.
NORTHEAST GULF OF MEXICO HYDROGRAPHIC SURVEY DATA COLLECTED IN 1965.
Technical rept., Jan-Dec 65,
by R. D. Gaul, R. E. Boykin, and D. E. Letzring. Apr 66, 212p Ref-66-8T
Contract Nonr-2119 (04),
Projs. NR-083-036, A/M-286-D

Descriptors: (*Hydrographic surveying, *Mexico Gulf), (*Oceanology, Mexico Gulf), Oceanographic data, Tables, Graphics.

This report summarizes data collected during periodic hydrographic surveys made in 1965 over the continental shelf and slope of the northeast Gulf of Mexico. The survey region extends from the Mississippi Delta to Cape San Blas, Florida (about 300 nautical miles) and offshore to about the 1,000 fathom depth contour (100 to 110 nautical miles). Hydrographic observations consisted mainly of vertical profiles of temperature and salinity obtained by means of bathythermographs and salinity determinations of water samples taken at selected depths or by a salinity/temperature/depth (STD) instrument. In addition, several thousand drift bottles were released at selected locations in the survey area. (Author)

AD-632 710 **See Field 8C**

AD-632 721 **See Field 4B**

AD-632 757 **See Field 8C**

AD-632 768 **See Field 8C**

AD-632 769 **See Field 8C**

AD-632 841 **See Field 8C**

AD-633 087 **See Field 8C**

AD-633 097 **See Field 8K**

AD-633 105 **See Field 5A**

AD-633 271 **See Field 8N**

8K. SEISMOLOGY

AD-632 956 **Field 8K, 17J**
CFSTI Prices: HC$2.00 MF$0.50
Teledyne Industries, Inc., Alexandria, Va. Earth Sciences Div.
LONG RANGE SEISMIC MEASUREMENTS. BUFF.
Scientific rept.,
by Don M. Clark. 5 Apr 66, 43p Seismic Data Lab-143
Contract AF 33 (657)-15919, ARPA Order-624, Proj. VELA-T/6702

Descriptors: (*Seismology, *Nuclear explosions), (*Underground explosions, Seismology), Earthquakes, Explosions, Seismic waves, Detection, Identification systems, Test facilities, Nevada.

Identifiers: BUFF event, Vela-Uniform.

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-632 957 **Field 8K, 17J**
CFSTI Prices: HC$3.00 MF$0.50
Teledyne Industries, Inc., Alexandria, Va. Earth Sciences Div.
LONG RANGE SEISMIC MEASUREMENTS. RED HOT.
Scientific rept.,
by Don M. Clark. 6 May 66, 54p Seismic Data Lab-145
Contract AF 33 (657)-15919, ARPA Order-624, Proj. VELA T/6702

Descriptors: (*Seismology, *Nuclear explosions), (*Underground explosions, Seismology), Earthquakes, Explosions, Seismic waves, Detection, Identification systems, Test facilities, Nevada.

Identifiers: Red Hot event, Vela-Uniform.

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-632 959 **Field 8K**
CFSTI Prices: HC$2.00 MF$0.50
Teledyne Industries, Inc., Alexandria, Va. Earth Sciences Div.
THE PARTIAL COHERENCY STUDY. PART ONE. COHERENCE TESTS ON SEISMIC NOISE MODELS. PART TWO. A PRELIMINARY ANALYSIS WITH SEISMIC NOISE RECORDED IN AN ARRAY FROM THE CUMBERLAND PLATEAU SEISMOLOGICAL OBSERVATORY.
Progress rept. (Scientific),
by Loren D. Enochson, and R. H. Shumway. 11 May 66, 50p Seismic Data Lab-146
Contract AF 33 (657)-15919, ARPA order-624, Proj. VELA T/6702
Prepared in cooperation with Measurement Analysis Corp., Los Angeles, Calif. and Westat Research, Inc., Bethesda, Md.

Descriptors: (*Microseisms, Statistical analysis), (*Seismology, Microseisms), (*Seismometers, *Noise analyzers), Tennessee, Seismological stations, Data processing systems, Seismic waves, Noise, Background.

Identifiers: Partial coherence, Cumberland Plateau Seismological Observatory.

This report, divided into two parts, discusses the partial coherence function as a quantitative measure of linear relationship between two variables. Under appropriate conditions, the partial coherence between two variables will provide a more pertinent measure of their relationship than will ordinary coherence functions. Part One is concerned with the theoretical problem of determining the structure of seismic noise in an array of seismometers. Part Two is concerned with applying the theory to an actual array of seismometers, located at the Cumberland Plateau Seismological Observatory. (Author)

AD-633 097 **Field 8K, 8J**
CFSTI Prices: HC$1.00 MF$0.50
American Committee for the Weizmann Inst. of Science, Inc., New York.
FREE OSCILLATIONS OF THE EARTH AND TIDES IN THE OCEAN.
Final rept. 1 Oct 55-30 Sep 65,
by C. L. Pekeris. 10 Apr 66, 16p
Contracts Nonr-1823 (00), AF 61 (052)-509,
Proj. NR-081-229

Descriptors: (*Earth (Planet), Oscillation), (*Tides, Mathematical analysis), Seismology, Oceanology, Geophysics.

Contents: The Free Oscillations of the Earth; The Inverse Problem; Solution of Laplace's Tidal Equations for the Real World Oceans; Determination of the Average Depth in the Real World Oceans in a 1 degree Mesh; Methods of Evaluating Integrals of Oscillatory Functions.

AD-633 304 **Field 8K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Uppsala Univ. (Sweden). Seismological Inst.
HIGHER MODES OF SEISMIC SURFACE WAVES: MODE SEPARATION,
by Stuart Crampin, and Markus Bath. Aug 64, 21p Rept. no. 15
Contract AF 61 (052)-702

Descriptors: (*Seismology, *Data processing systems), Earthquakes, Microseisms, Seismic waves, Wave analyzers, Digital computers.

A digital computer is used to filter seismograms in order to separate the higher modes from each other and from fundamental modes and microseisms. The filtered traces show higher modes for a longer time than the original seismogram and modes may be visible which were previously undetected. Mode separation results in some alterations to dispersion curves measured from original seismograms. These changes are minor in the majority of cases when only the second mode is recorded on the seismogram but may be important when several modes are present. Without mode separation it is very difficult to distinguish visually between the crests and troughs of two higher mode wave trains when they arrive simultaneously. The filtering has revealed the existence of a 'coda' to the higher mode wave trains similar to the well-known 'coda' of the fundamental mode Rayleigh waves. The channel waves are usually seen as amplitude increases on the filtered traces. (Author)

8L. SNOW, ICE, AND PERMAFROST

AD-632 740 **Field 8L**
CFSTI Prices: HC$1.00 MF$0.50
Directorate of Scientific Information Services, Ottawa (Ontario).
ICE (FORMATION) AT ABOVE-ZERO AIR TEMPERATURE,
by V. N. Kupecki. Sep 65, 3p T-441-R
TT 66-61248
Trans. of Priroda (USSR) v54 n6 p81-2 1965.

Descriptors: (*Ice, Phase studies), Atmospheric temperature, Ice islands, Crystal growth, Meteorology, Kara Sea, USSR.

AD-632 987 **Field 8L, 8H**
CFSTI Prices: HC$3.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
ICE COVER OF AN ARCTIC PROGLACIAL LAKE.
Research rept.,
by George K. Swinzow. Mar 66, 51p RR-155
Projs. DA-1V025001A13001, DA-1V014501B52A02

Descriptors: (*Ice, *Lakes), Arctic regions, Ice islands, Phase studies, Crystallography, Greenland, Micrometeorology, Permafrost.

The results are presented of 2 field seasons of research on Lake Tuto, NW Greenland, and the specific thermal environment, forms of ice, conditions of gas exsolution, and special conditions of ice waste are discussed. Special forms of ice and coarse air inclusions called worm bubbles are reported. An observation of ice waste from the upper surface at low temperatures is attributed to a combination of sublimation and abrasion by blowing snow. Temperatures in the 2-m thick ice cover, as well as in water, were observed during ice growth. These and other observations suggest that sunlight is the main heat source and the sun penetration of the ice may raise the water temperatures an appreciable degree. It was found that the lake

water contains 3% to 4% gas while the ice contains 0.5% of dissolved gases of a composition probably differing from that of the air. Existing theories of solute rejection by the moving solid-liquid interface are found inadequate for the case of the ice-water-gas system. It is concluded that worm bubbles may form by a mechanism other than nucleation at the interface. (Author)

AD-633 032 **Field 8L, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
HIGH SNOWFIELDS OF THE ST. ELIAS MOUNTAINS YUKON TERRITORY, CANADA.
Technical rept.,
by Edward Grew, and Malcolm Mellor. Mar 66, 25p TR-177
Proj. DA-1L013001A91A

Descriptors: (*Climatology, Yukon territory), (*Snow, Yukon territory), Solar radiation, Meteorology, Mountains, Canada.

Observations made during the 1964 summer provide a description of snow and radiation characteristics for the region and give insight into effects of altitude, regarded as a gross variable, when anomalous wind and slope effects are excluded. Divide Camp, Seward Camp, and Lucania Camp were occupied successively within a minimum period of time to compare conditions at different altitudes. Data are presented on snow profiles, snow accumulation measurements, the development of the annual snow layer, snow conditions at depth, the mechanical properties of the snow, snow densification, solar radiation, and the variation of snow properties with surface altitude. It is concluded that as long as local anomalies are avoided, the effects of surface altitude on snow properties and surface processes seem to be simple. However, in mountain regions it is probably a combination of local conditions which produces the most remarkable effects. (Author)

8M. SOIL MECHANICS

AD-632 802 **Field 8M, 13B**
CFSTI Price: MF$1.00
California Univ., Berkeley. Dept. of Civil Engineering.
BEHAVIOR OF STABILIZED SOILS UNDER REPEATED LOADING. REPORT I. BACKGROUND, EQUIPMENT, PRELIMINARY INVESTIGATIONS, REPEATED COMPRESSION AND FLEXURE TESTS ON CEMENT-TREATED SILTY CLAY,
by J. K. Mitchell, Chih-Kang Shen, and C. L. Monismith. Dec 65, 136p
Contract DA-22-079-eng-414,
Proj. DA-1-V-O-21701-A-046-05
AEWES CR-3-145

Descriptors: (*Soil mechanics, Stabilization systems), (*Civil engineering, Soil mechanics), (*Pavements, Soils), (*Roads, Soil mechanics), Clay, Silt, Additives, Cements, Compressive properties, Flexural strength, Loading (Mechanics), Instrumentation, Military requirements.

Current methods of pavement design using stabilized soils as components of the pavement structure generally base selection of both quality and thickness of those materials on static tests such as the CBR procedure. To validate such procedures, the objectives of these studies are to evaluate the behavior of stabilized soils under dynamic loading conditions and develop improved criteria for quality design and thickness selection within a more rational framework. More specifically the study is concerned with examination of soil stabilization requirements established by the Corps of Engineers for military roads and airfields in the theater of operations within this framework. Two soils, Vicksburg Silty Clay and Vicksburg Buckshot Clay, were selected for study because of the considerable performance data on these soils and because, through suitable treatment, they fall within the range of stabilization requirements of the Corps. To date, most of the dynamic testing has been performed on the treated silty clay. In general the results obtained thus far indicate that cement-treated soil designed to meet Corps' criteria for CBR and compressive strength can withstand repeated compressive and flexural stresses of the magnitude and number prescribed for different classes of military operations. However, more detailed investigation of the influence of water content, mixing procedures, and method of compaction are required since the data obtained show that these variables significantly affect the strength and resilience characteristics of the cement-treated silty clay. (Author)

AD-633 120 **Field 8M, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Iowa Engineering Experiment Station, Ames.
MORPHOMETRIC COMPARISON OF HAYDEN PRAIRIE AND ADJACENT CULTIVATED AREA.
Technical rept.,
by Keith W. Anderson, and R. A. Lohnes. 1966, 14p TR-1, Contrib-66-7
Contract Nonr-4868 (01),
Projs. NR-389-144, 580-S

Descriptors: (*Soil mechanics, Erosion), (*Erosion, Iowa), Soils, Terrain, Geography, Hydrology, Agriculture.

Morphometric study of a virgin prairie area and adjacent cultivated farm land reveals no statistical difference in the slopes of the two areas. However, analysis by use of an elevation-percent area curve provides evidence that the landscape has been lowered about 0.132 feet in the last 100 years. Calculations of erosion rates using this curve are of the same order of magnitude as erosion rates calculated from sediment yield data. The erosion rates of individual basins are inversely proportional to the stream gradients in the basins. This observation is in accord with the equilibrium theory of drainage basin development and suggests that the erosion resistance of the glacial till varies between first order basins. (Author)

AD-632 780 **See Field 6F**

AD-633 255 **See Field 19A**

8N. TERRESTRIAL MAGNETISM

AD-632 875 **Field 8N, 4A**
CFSTI Prices: HC$2.00 MF$0.50
Newcastle Univ. (Australia). Dept. of Physics.
SYMPOSIUM ON GEOMAGNETIC MICROPULSATIONS HELD IN THE PHYSICS DEPARTMENT, UNIVERSITY OF TASMANIA, 23rd AUGUST-24th AUGUST, 1965. CONTRIBUTIONS.
1965, 37p
Grant Nonr (G)00027-65

Descriptors: (*Magnetohydrodynamics, *Geophysics), (*Terrestrial magnetism, Magnetohydrodynamics), Meteorological phenomena, Instrumentation, Symposia, Australia.

AD-633 271 **Field 8N, 8J, 8E**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
ACCURACY IN DETERMINING THE VERTICAL COMPONENT OF THE GEOMAGNETIC FIELD FOR AN ELECTROMAGNETIC CURRENT MEASURING INSTRUMENT,
by V. V. Novysh. 1966, 19p Translation-2094
TT 66-61283
O Tochnosti OPREDELENIYA Vertikalnoi Komponenty Geomagnitnogo Polya dlya Emita, trans. of okeanologiya (USSR) v5 n4 p718-24 1965.

Descriptors: (*Terrestrial magnetism, *Hydrographic surveying), (*Marine geophysics, Terrestrial magnetism), (*Geodesics, Terrestrial magnetism), Magnetic fields, Mapping, Oceanology, USSR.

AD-633 320 **Field 8N, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
MICROVARIATION MAGNETIC STATION WITH A PASSBAND FROM 0.003 TO 10 cps,
by Yu. M. Egorov. 1966, 8p Translation-1000-b
TT 66-61320
Trans. of mono. Mikrovariatsionnaya Magnitnaya Stantsiya s Polosoi Propuskaniya ot 0.003 d0 10 gps, Leningrad, 1963 p157-64.

Descriptors: (*Magnetometers, USSR), (*Terrestrial magnetism, Magnetometers), Magnetic fields, Oscillation, Measuring devices (Electrical ; Electronic), Band-pass filters.

N66-18392 **Field 8N**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ROCKET MEASUREMENTS OF THE GEOMAGNETIC FIELD ABOVE WOOMERA, SOUTH AUSTRALIA,
by K. Burrows, and S. H. Hall. 1965, 36p NASA-TM-X-54957

Descriptors: *Magnetometer, *Rocket measurement, *Geomagnetic field.

N66-18394 **Field 8N**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
MAGNETIC STORMS IN THE EARTH'S MAGNETIC TAIL,
by K. W. Behannon and N. F. Ness. Oct 65, 87p NASA-TM-X-55387, X-612-65-417

Descriptors: *Magnetic storm, *Geomagnetic field, *Solar wind.

AD-633 104 **See Field 14B**

AD-633 105 **See Field 5A**

AD-633 306 **See Field 8G**

AD-633 321 **See Field 8G**

9A. COMPONENTS

AD-458 536 **Field 9A, 9E**
CFSTI Price: HC$2.60
Collins Radio Co., Newport Beach, Calif.
FILTER CRYSTAL DEVELOPMENT PROGRAM (70 to 150MC).
Quarterly progress rept. no. 5, 15 Jul-15 Oct 64. 15 Oct 64, 23p
Contract DA-36-039-AMC-03207 (E),
Proj. DA-1G6-22-001
N65 19550

Descriptors: (*Crystal filters, Quartz resonators), (*Quartz resonators, Experimental design), Electronic equipment, Frequency, Resistance (Electrical), Circuits, Measurement, Test equipment, Electrodes, Very high frequency.

The results of experimental work concerned with the 70 mc group of crystals are discussed. Emphasis is placed upon the problem areas encountered in this study: the erratic behavior of the motional resistance of the crystal units and the problems encountered in trying to measure accurately the resonant frequency of unplated crystal blanks. The

methods and equipments which are being used to resolve these difficulties in the 90 mc study are discussed in detail. (Author)

AD-459 421 **Field 9A, 9C**
CFSTI Price: HC$20.90
Westinghouse Electric Corp., Elmira, N. Y. Electronic Tube Div.
FEASIBILITY OF A HOLLOW-CATHODE NEGATIVE -GRID TUBE FOR VHF-UHF APPLICATIONS.
Final rept. no. 9, 1 Jul 62-30 Sep 64,
by J. P. Pietrzyk. 30 Sep 64, 213p
Contract DA-36-039-sc-90845,
Task 1G6-22001-A-055-02

Descriptors: (*Cathodes (Electron tubes), Feasibility studies), (*Triodes, Cathodes (Electron tubes)), Electron tube parts, Electrodes, Very high frequency, Ultrahigh frequency, Temperature, Noise (Radio), Tests, Direct current, Radiofrequency pulses, Electric currents, Gain, Radiofrequency power, Microwave oscillators, Electron tubes.

Included in this report is the study of slotted hollow cathodes. Relationship to spacings, temperature, and grid structures are reported. D. C., as well as pulse, tests and noise measurements are shown. The performance of a microwave triode containing a hollow cathode is compared with a conventional triode at frequencies between 3.5 and 3000 mc/sec. In a rough analysis it is tried to explain the general behavior of this type of cathode. (Author)

AD-632 698 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Lewis (E. B.) Co., Inc., East Hartford, Conn.
PRODUCION ENGINEERING MEASURE CRYSTAL UNIT CR- (XM-46A).
Quarterly rept. no. 12, 1 Nov 65-1 Feb 66,
by Ernest B. Lewis. 1 Feb 66, 23p
Contract DA-36-039-sc-86737
See also AD-631 021.

Descriptors: (*Crystal filters, Manufacturing methods), Failure (Electronics), Very high frequency, Resistance (Electrical), Performance (Engineering), Quartz, Wiring diagrams.

The reasons for the failure of the 70 MC/s preproduction samples are analyzed. The problems of the instrumentation limitations with particular reference to obtaining satisfactory values of C sub 1 are discussed. The redesign of the 70 MC/s units with reference to flatness, plateback and spot size are explained and doumented. The revised manufacturing and testing procedures now possible with the new design are presented. (Author)

AD-632 709 **Field 9A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
ITT Electron Tube Div., Easton, Pa.
PRODUCTION ENGINEERING MEASURE FOR A PHASE II SUPER POWER HYDROGEN THYRATRON TUBE.
Quarterly progress rept. 15-16, 7 Sep 65-6 Mar 66,
by H. E. Krefft. 6 Mar 66, 30p
Contract DA 36-039-sc-85985

Descriptors: (*Thyratrons, Hydrogen), Manufacturing methods, Performance (Engineering), Electron tube parts, Electrodes, Test methods, Life expectancy, Design.

Evaluation of tube No. 13, design 'A', made for assessing manufacturing conditions at the Easton plant, did not show an improvement over previous tubes. Changes in the grids of tube No. 14 were made in accordance with the program of work outlined in the previous Progress Report (AD-629 287). A baffled box type gradient grid was substituted for the original one plate grid, and baffling of the control grid was increased. Improved performance at low repetition rates was observed, but evaluation at high PRR under specified conditions was not possible owing to continued failures of the Phase II test modulator. A general overhaul of the set was initiated. (Author)

AD-632 716 **Field 9A, 18H, 20L**
CFSTI Prices: HC$3.00 MF$0.75
Hughes Aircraft Co., Newport Beach, Calif. Microelectronics Div.
EFFECT OF TRANSISTOR DESIGN PARAMETERS ON RADIATION RESPONSE (SURFACE EFFECTS).
Rept. no. 4 (final), 15 Dec 64-15 Dec 65,
by B. D. Gallagher, V. R. Honnold, and J. J. Mazenko. Apr 66, 64p
Contract DA-28-043-AMC-00418 (E)
ECOM 00418 (E)
See also AD-625 533.

Descriptors: (*Transistors, *Radiation damage), (*Surface properties, Transistors), (*Semiconductors, Radiation damage), Experimental design, Silicon, Carriers (Semiconducts), Leakage (Electrical), Transients, Surface area, Solid state physics.

During this program, the relationship between various transistor surface conditions and transient device leakage currents (delta I sub CBO) due to radiation exposure were studied. These studies were made by utilizing both 2N708 type transistors with various surface treatments, and similarly treated groups of n type silicon bars. The primary surfaces studied were (1) oxidized, (2) sandblasted, etched, and mechanically polished. Additionally, an analytical model describing the predominate mechanism of surface radiation effects was developed. This relationship was tested against the experimental data and order of magnitude agreement was found. The program has led to the following conclusions: (1) At a given value of surface recombination velocity, the radiation induced response, delta I sub CBO, in a device is less for smaller values of minority carrier lifetime. Thus, no device characteristic compromise is necessary to achieve maximum device radiation resistance. (2) A small increase in radiation resistance can be achieved in a device by increasing surface recombination velocity. However, the improvement in radiation resistance is obtained at the cost of decreased transistor gain and increased leakage currents. (Author)

AD-632 729 **Field 9A, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Momorial Inst., Columbus, Ohio.
MEASUREMENT OF TRUE SURFACE AREA IN ELECTRODES.
Final technical documentary rept. 15 Dec 64-15 Feb 66,
by J. McCallum, R. W. Hardy, and R. F. Redmond. Apr 66, 102p BATT-7138
Contract AF 33 (615)-2225,
Task AF-817303-004
AFAPL TR-66-31

Descriptors: (*Electrodes, Surface area), Porous materials, Measurement, Electrochemistry, Capacitance, Carbon, Nickel.

Double-layer capacitance measurements were selected as a means to measure true surface areas. When a constant-current pulse is applied to the double layer capacitance inside a pore, the change of voltage is usually observed to be nonlinear with time. This report provides experimental verification of theoretical predictions by others on how such a voltage transient is related to the geometric dimensions of the pore, the electrolyte resistivity, and the double-layer capacitance. New theoretical work shows a capacitance charging curve will become linear with time (a) for a single uniform pore, (b) for multiple pores of uniform shape, with or without mixed dimensions, and (c) for finite multiple pres with any shape. Faradaic current is shown to have negligible effect if that reaction current is constant and small relative to the capacitance charging current. Measurements on porous carbon and sintered nickel plaques give areas from 20 to 80% of BET values. Thus, a substantial part of the surface of these electrodes appears to be unwetted. (Author)

AD-632 839 **Field 9A, 9C**
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Camden, N. J. Communications System Div.
MICROMODULE LIFE TEST PROGRAM.
Quarterly progress rept. no. 4, 17 Jun-17 Sep 65,
by F. E. Farmar. 17 Sep 65, 49p
Contract DA-36-039-AMC-01462 (E)
See also AD-628 012.

Descriptors: (*Microminiaturization (Electronics), Modules (Electronic)), (*Modules (Electronic), Life expectancy), Analog systems, Digital systems, Electronic equipment, Failure (Electronics), Reliability (Electronics), Test methods.

A total of 2674 micromodules remained on life test at the beginning of this quarter and twenty-two failures occurred during this period. Included in the number of failures for the XM-1364 modules are 41 failures that were caused by inserting the module in the test socket or the life test board in the wrong position which results in the wrong voltages being applied to the module riser wires causing permanent module damage. (Author)

AD-632 848 **Field 9A, 20L, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
THIN FILM TECHNIQUES FOR SILICON INTEGRATED CIRCUITS.
Quarterly technical progress rept. no. 5, 1 Aug-31 Oct 65,
by R. W. Wilson. Apr 66, 31p
Contract DA-28-043-AMC-00097 (E),
Proj. DA-1P6-22001-A056,
Task 02
ECOM 00097-5
See also AD-632 931.

Descriptors: (*Integrated circuits, *Semiconducting films), (*Silicon, Integrated circuits), Microminiaturization (Electronics), Cermets, Resistors, Films, Capacitors.

During the past quarter the following was accomplished: (1) Modification of the cermet-evaporation system with respect to powder feed, resistance and film rate monitoring, and electron gun orientation to obtain more uniform deposition characteristics. (2) Design of a new resistor test mask set to permit more rapid and more exact measurement of resistor films. (3) Continued investigation as to the best method of depositing aluminum for use as a thin film capacitor lower conductor either by itself or in combination with other materials such as tantalum or titanium. (4) Ordering the necessary equipment to r-f sputter dielectric films. (5) Improvement of film thickness measurement techniques using the ellipsometer and interferometer. (6) Continuation of the 1000-hour life tests on the compatibility vehicles consisting of a thin film resistor, transistor, and capacitor and (7) Acquisition and use of equipment to study methods of making high frequency measurements of thin film components. (Author)

AD-632 931 **Field 9A, 20L, 9E**
CFSTI Prices: HC$3.00 MF$0.75
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
THIN FILM TECHNIQUES FOR SILICON INTEGRATED CIRCUITS.

Quarterly rept. no. 4, 1 Jun 64-31 Jul 65,
by C. D. Phillips and R. W. Wilson. Apr 66, 94p
Contract DA-28-043-AMC-00097 (E)
Proj. DA-1P6-22001-A-056,
Task 1P6-22001-A-056-02
ECOM 00097 (E)
See also AD-619 946.

Descriptors: (*Integrated circuits, *Semiconducting films), (*Silicon, Integrated circuits), Microminiaturization (Electronics), Cermets, Resistors, Films, Capacitors.

This program is a continuation of the program initiated in 1963. Under the initial program the contractor studied the effects of thin film materials and processes used in the film technologies existing at that time. The compatibility of materials and processes with silicon integrated circuits was verified. Thin film resistive and capacitive elements were fabricated on silicon chips containing a 2N708-class silicon transistor; a detailed characterization of these samples was made. The required circuits were fabricated, characterized, and delivered to the USAEL. The performance objectives of the present program was to obtain compatible thin film capacitors and resistors.

AD-633 009 **Field 9A, 13H**
CFSTI Prices: HC$5.00 MF$1.25
Naval Avionics Facility, Indianapolis, Ind.
TRANSFER OF FABRICATION TECHNOLOGIES OF THIN FILM ACTIVE AND EXTREME ENVIRONMENT PASSIVE DEVICES.
Final rept.,
by M. G. Cowart, and William McGuire. 15 Mar 66, 199p NAFI-TR-750
Contract N163-1287 (X)

Descriptors: (*Films, *Microminiaturization (Electronics)), Semiconducting films, Vapor plating, Vacuum apparatus, Substrates, Metal films, Capacitors, Resistors, Transistors, Processing, Cadmium alloys, Selenium alloys, Compatibility, Rhenium, High-temperature research, Manufacturing methods, Circuits, Naval research.

Identifiers: Cadmium selenide.

The report describes the transfer of vacuum deposition technologies relative to thin film active devices and high temperature passive devices from Melpar, Incorporated, to the U. S. Naval Avionics Facility, Indianapolis. Detailed descriptions are included of apparatus, materials, test equipment, fabrication procedures, and process parameters. (Author)

AD-633 012 **Field 9A, 13H**
CFSTI Prices: HC$4.00 MF$1.00
Bendix Semiconductor Div., Bendix Corp., Holmdel, N. J.
PRODUCTION ENGINEERING MEASURE FOR IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY OF SILICON TRANSISTOR TYPE 2N3055.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 66,
by John Mechura, and Robert Bolvin. 31 Mar 66, 145p
Contract DA-36-039-AMC-06171 (E),
Proj. 24001,

Descriptors: (*Manufacturing methods, *Transistors), (*Silicon, Transistors), Reliability (Electronics), Semiconductor devices.

The purpose of the work performed in this contract is: To establish process improvements for the Silicon Transistor Type 2N3055 so as to attain improved operating reliability level per 1,000 hours at 25C with 90% confidence level. To incorporate two process improvements into the production facilities, and To supply engineering test samples incorporating the improved processes. During the first quarter, one group of Engineering Test Samples were shipped as per the contract requirement. The major areas of engineering activity during the report period were on the following device processing steps: geometry studies, mechanization studies, diffusion studies, wafer requirement studies, contact metallization studies, assembly studies, and device rating studies. A Program Management Chart was developed, submitted and accepted for the work planned during this contract period of eighteen months.

AD-633 057 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Irmo, S. C. Electronic Specialty Capacitor Business Section.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF HERMETICALLY SEALED TANTALUM FOIL CAPACITORS.
Quarterly rept. no. 2, 20 Dec 65-20 Mar 66,
by R. M. Trewhella. 20 Mar 66, 25p
Contract DA-36-039-AMC-06169 (E)
See also AD-629 385.

Descriptors: (*Tantalum capacitors, *Manufacturing methods), Reliability (Electronics), Foils, Hermetic seals, Welding.

The accomplishments during the second quarter reporting period have been the manufacturing completion and 1,000 hour 125C operating life test results on the special capacitors in the product improvement evaluation program. There were no degradation or catastrophic failures during this 1,000 hour test interval. Efforts have continued on the work areas to improve the overall quality of the unit and to reduce in-process losses and potential capacitor failures. The Teflon end insulation has demonstrated good results by reducing the aging shorts by 70 percent, therefore; the final design will include this type of lead insulation. A review of the wide variability with the present extraction process indicated the time capacitors soak in electrolyte to be critical. This report also includes the plans for the next quarter, list of reports issued and conferences held, and list of personnel hours expended during this period. (Author)

AD-633 062 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Cornell-Dublier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
PRODUCTION ENGINEERING MEASURE FOR CAPACITORS, FEED-THROUGH, SOLID ELECTROLYTE TANTALUM PELLET.
Quarterly rept. no. 8, 1 Jan-31 Mar 66,
by W. G. Bailey. 31 Mar 66, 13p
Contract DA-36-039-AMC-03630 (E)
See also AD-629 199.

Descriptors: (*Tantalum capacitors, *Manufacturing methods), (*Electrolytic capacitors, Manufacturing methods), Quality control, Life expectancy.

Four lots of the required five lots of production run units were started during this quarter. All units were completed to the point of removal from formation bars after graphite and silvering. Long vendor delivery schedules of the other capacitor parts have prevented the completion of assembly of any of these four lots of capacitors. Aging and life test facilities were started during this quarter and have progressed satisfactorily. All parts for the DC leakage monitoring circuitry for the life test have been received and preliminary wiring has been started. Capacitor manufacturing and assembly, and aging and life test facilities will be continued in the coming quarters.

AD-633 141 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
Quarterly rept. no. 11, 29 Nov 65-28 Feb 66.
28 Feb 66, 16p
Contract DA-36-039-AMC-01475 (E)
Rept. on Production Engineering Measure. See also AD-631 064.

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Electronic switches, *Semiconductor devices), Gates (Circuits), Leakage (Electrical), Life expectancy, Performance (Engineering), Test equipment, Voltage.

The report presents results obtained from preproduction testing of a 2N1765 device lot, solutions to problems involving leakage current, dv/dt, and turn-on time, and descriptions of work performed on life test facilities. (Author)

AD-633 147 **Field 9A, 13H**
CFSTI Prices: HC$3.00 MF$0.75
TRW Semiconductors, Inc., Lawndale, Calif. Research and Development Dept.
TRANSISTOR, VHF, SILICON, POWER TYPE EL-2N (X-9) 5W 500 MC PEM.
Quarterly rept. no. 3, 1 Nov 65-31 Jan 66,
by R. Clarke, J. Crishal, J. Rice, P. Risinger, andW. Weisenberger. 31 Jan 66, 72p
Contract DA-36-039-AMC-06163 (E)
See also AD-631 522.

Descriptors: (*Transistors, Manufacturing methods), Ultrahigh frequency, Silicon, Radiofrequency power, Sputtering, Gain, Effectiveness, Diffusion, Configuration, Packaging.

Processing of lots continues to reduce the base width to 0.3 to 0.45 micron on a controllable basis. Sputtered metallizing has been accomplished. The glassified molded package has been modified to facilitate its use in the circuit and to simplify assembly. Interim interdigitated (four) and interrupted emitter (six) patterns were produced and evaluated for optimum performance. Only the interdigitated pattern with the largest dimensions (0.3 mil metal strips with 0.2 mil clearance) was noticeably poorer than the rest. The remaining nine patterns typically produced 10 watts at 500 Mc and 28 volts, with 6.0 to 7.5 db of power gain and 60 to 70% collector efficiency. These results were used to produce a final interdigitated pattern, which has initially produced 10 watts with 7.0 to 7.5 db of power gain with 65 to 70% collector efficiency. (Author)

AD-633 288 **Field 9A, 9B, 20L**
CFSTI Prices: HC$1.00 MF$0.50
RCA Labs., Princeton, N. J.
INTEGRATED LOGIC NETS.
Interim rept., 1 Jul 64-28 Feb 66,
by Adolph K. Rapp. May 66, 20p Scientific-1
Contract AF 19 (628)-4208,
Proj. AF-4641,
Task 464104
AFCRL 66-272

Descriptors: (*Computer logic, *Integrated circuits), (*Transistors, Integrated circuits), Semiconductors, Oxides, Metals.

Investigations have been conducted into the technology necessary to interconnect arrays of n- and p-type MOS transistors into complementary-symmetry digital circuits. A memory module consisting of four n-type and four p-type transistors was chosen as the test vehicle. It is shown that first-level wiring on each array requires a blanket insulation between one and two microns thick to reduce wiring capacitance, and a scheme is described whereby access holes through any vacuum-deposited insulator may be obtained. The interconnection of the n-type and p-type arrays is accomplished by evaporating solder dots at appropriate points on each array, placing the arrays face-to-face, and heating in a reducing atmosphere to pro-

duce solder connections. Alignment is accomplished by looking through the silicon wafers with an infrared-to-visible light converter; the wafers are illuminated from below with a Sun Gun which also serves as the heat source when intensity is increased. (Author)

AD-633 322 **Field 9A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Lynchburg, Va. Communication Products Dept.
MICROMINIATURE CRYSTAL UNIT TYPE CR-(XM-47) /U. PRODUCTION ENGINEERING MEASURE.
Quarterly progress rept. no. 3, 27 Nov 65-27 Feb 66,
by R. L. Hatcher, and R. D. Laney. 27 Feb 66, 30p
Contract DA-36-039-AMC-06166 (E)
See also AD-628 337.

Descriptors: (*Crystals, *Microminiaturization (Electronics)), Manufacturing methods, High frequency, Electron beam welding, Reliability (Electronics), Aging (Materials), Design.

Engineering Sample Group no. 3 was completed and shipped to the customer on schedule. The aging problem has been isolated and corrective action taken. An additional Engineering Sample Group is being submitted for evaluation. In process Quality Control equipment is complete. The reliability equipment is being assembled. Manufacturing personnel have been trained. (Author)

AD-633 411 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
CORRELATION BETWEEN THE CONDUCTIVITY AND THE EMISSION CHARACTERISTICS OF CESIUM OXIDE CATHODES,
by P. Borziak. May 66, 18p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1M624201D466
TT 66-61376, AERDL T-1840-66
Trans of Zhurnal Tekhnicheskoi Fiziki (USSR) v9 n22 p2032-41 1939.

Descriptors: (*Oxide cathodes, *Cesium compounds), (*Cesium electron tubes, Oxide cathodes), USSR, Electrical conductance, Secondary emission, Electrodes (Electron tube), Thermal conductivity, Films, Performance (Engineering).

An investigation was made of the emission properties of a complex cesium oxide cathode in connection with the electrical conductivity of the films of this cathode.

N66-15471 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.75
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
GENERAL PURPOSE SUB-ASSEMBLIES.
Jun 65, 47p AECL-2294, ELI-91

Descriptors: *Printed circuit, *Instrumentation.

N66-15768 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
DESIGN, DEVELOPMENT AND MANUFACTURE OF HIGH RELIABILITY COMPUTER GRADE MINIATURE CAPACITORS.
Final rept. 30 Jun 64-18 Sep. 65. 1965, 10p
Contract NAS8-11701
NASA CR-69541

Descriptors: *Capacitor, *Electric property, *Minia ture electronic equipment.

N66-16052 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
GAMMA, ELECTRON, AND PROTON RADIATION EXPOSURES OF P-CHANNEL, ENHANCEMENT, METAL OXIDE SEMICONDUCTOR, FIELD EFFECT TRANSISTORS,
by H. E. Wannemacher. Aug 65, 50p NASA-TM-X-55359, X-716-65-351

Descriptors: *Metal oxide semiconductor (mos), *Field effect transistor (fet), *Gamma radiation, *Proton irradiation.

N66-17283 **Field 9A**
CFSTI Prices: HC$7.71 MF$2.25
General Electric Co., Schenectady, N. Y. Research and Development Center.
EVALUATION OF THIN WALL SPACECRAFT ELECTRICAL WIRING. VOLUME I-TEST RESULTS.
Final rept.,
by L. J. Frisco and K. N. Mathes. 28 Sep 65, 471p

Contract NAS9-4549
NASA CR-65213

Descriptors: *Electric wiring, *Spacecraft electronic equipment, *Environmental testing, *Performance characteristics, *Thin wall.

N66-17284 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Schenectady, N. Y. Research and Development Center.
EVALUATION OF THIN WALL SPACECRAFT ELECTRICAL WIRING. VOLUME II-SUMMARY AND CONCLUSIONS.
Final rept.,
by L. J. Frisco and K. N. Mathes. 28 Sep 65, 95p
Contract NAS9-4549
NASA CR-65214

Descriptors: *Environmental testing, *Performance characteristics, *Thin wall, *Electric wiring, *Space craft electronic equipment.

N66-18308 **Field 9A**
CFSTI Prices: HC$4.00 MF$1.00
Melpar, Inc., Falls Church, Va.
THIN-FILM PERSONAL COMMUNICATIONS AND TELEMETRY SYSTEM (TFPCTS).
Final rept. (Phase A), 21 Dec64-21 Dec 65. Feb 66, 125p
Contract NAS9-3924
NASA CR-65235

Descriptors: *Cadmium selenide, *Junction transistor, *Semiconductor, *Tellurium, *Thin film, *Triode.

N66-18310 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Melpar, Inc., Falls Church, Va.
THIN-FILM PERSONAL COMMUNICATIONS AND TELEMETRY SYSTEM (TFPCTS).
Quarterly rept. no. 2, 21 Mar-21 Jun 65,
by B. J. Weiner. Jul 65, 89p
Contract NAS9-3924
NASA CR-65234

Descriptors: *Semiconductor device, *Thin film, *Cadmium telluride, *Communication system.

AD-632 779 **See Field 20L**

AD-632 808 **See Field 20L**

AD-632 927 **See Field 14B**

AD-632 998 **See Field 20L**

AD-633 085 **See Field 19A**

AD-633 243 **See Field 9E**

AD-633 280 **See Field 20I**

AD-633 389 **See Field 11I**

9B. COMPUTERS

AD-462 338 **Field 9B, 19E**
CFSTI Prices: HC$6.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
REPORT ON THE GENERATION, SELECTION, AND IMPLEMENTATION OF BURST ERROR CORRECTION AND DETECTION FIRE CODES.
Technical memo.,
by P. T. Komiske. Mar 65, 64p TG-666
Contract NOw-62-0604-c

Descriptors: (*Errors, Corrections), (*Data trans mission systems, Reliability), (*Fire control systems, Reliability), Programming (Computers), Bursting charges.

AD-465 605 **Field 9B, 14B**
CFSTI Prices: HC$7.60 MF$0.75
Naval Ordnance Lab., White Oak, Md.
FORTRAN IV (IBM 7090) PROGRAM FOR THE DESIGN OF CONTOURED AXISYMMETRIC NOZZLES FOR HIGH TEMPERATURE AIR.
Final rept.,
by Walter J. Glowacki. 10 Feb 65, 80p NOLTR 64-219, Aerodynamics Research-235
N-65 30532

Descriptors: (*Programming (Computers), Design), (*Wind tunnel nozzles, Design).

A computer program is presented for designing contoured axisymmetric nozzles when the supply air temperature is high enough to produce real gas effects. The real gas properties of high temperature air in thermodynamic equilibrium are computed using empirical equations and assuming that the air under-goes an isentropic expansion. These properties are used to determine the potential core contour by solving the inviscid flow equations by the method of characteristics. The turbulent boundary layer growth is computed from a numerical integration of the momentum integral equation and is added to the potential core to obtain the nozzle contour. The heat transfer rate is calculated from a form of Reynolds analogy. The computer program covering these phases of nozzle design is presented with the instructions necessary for using it. (Author)

AD-466 359 **Field 9B, 12A**
CFSTI Prices: HC$1.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
SUMOP. A DIGITAL IMPLEMENTATION OF THE METHOD OF SUMS OF RESOLVABLE OPERATORS.
Technical memo.,
by Vincent G. Sigillito. May 65, 11p TG-682
Contract NOw-62-0604-c

Descriptors: (*Programming (Computers), Operators (Mathematics)), (*Operators (Mathematics), Functional analysis), Matrix algebra.

Identifiers: SUMOP.

This report describes SUMOP, a FORTRAN subroutine that implements the method of sums of resolvable operators. This procedure is used to calculate rigorous lower bounds for eigenvalues of certain self-adjoint operators in Hilbert space and, in particular, lower bounds for the frequencies of free vibration of some continuous linear elastic systems. SUMOP employs eigenvalues and eigenvectors of part problems to construct a matrix, the eigenvalues of which yield lower bounds to those of the self-adjoint operator. The inputs to SUMOP are double precision eigenvalues and single precision matrices of inner products of eigenvectors of the part problems. Computations involving the eigenvalues are done in double precision and rounded down to single precision prior to forming the matrix to be diagonalized. Calculations involved in the formation of this matrix are done in single precision rounded arithmetic. (Author)

AD-468 167 **Field 9B**
CFSTI Prices: HC$1.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
A DIGITAL PROCEDURE FOR USE OF THE METHOD OF EXTENSIONS AND RESTRICTIONS OF QUADRATIC FORMS.
Technical memo.,
by Nathan Rubinstein. Jun 65, 11p TG-706
Contract NOw-62-0604-c

Descriptors: (*Programming (Computers), Polynomials), (*Polynomials, Programming (Computers)).

This report describes the FORTRAN subroutine EROP that implements the method of 'Extensions and Restrictions of Operators' for calculation of rigorous lower bounds to eigenvalues of self-adjoint operators in separable Hilbert space, in particular, for lower bounds to frequencies of continuous lineaç elastic systems in free vibration. The method uses eigenvalues and eigenvectors of base problems to construct a matrix of which the eigenvalues are lower bounds to those of the self-adjoint operator. The inputs of EROP are double precision eigenvalues of the base problem and single precision matrices of inner products. Computations involving these eigenvalues are done in double precision and the elements of the matrix to be diagonalized are calculated in single precision rounded arithmetic. (Author)

AD-632 669 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Bolt, Beranek and Newman, Inc., Cambridge Mass.
THE BBN-LISP SYSTEM,
by Daniel G. Bobrow, D. Lucille Darley, Daniel L. Murphy, Cynthia Solomon, and Warren Teitelman. Feb 66, 85p BBN-1346, Scientific-1
Contract AF 19(628)-5065, ARPA Order-627,
Proj. AF-8668
AFCRL 66-180

Descriptors: (*Programming languages, Computer storage devices), Time, Magnetic materials.

Identifiers: LISP, Time sharing (Computers), Magnetic drum storage, IBM 7094, PDP-1 computer, Pushdown store, Random access memory, File structures.

The report describes in detail the BBN-LISP system. This LISP system has a number of unique features: most notably, it has a small core memory, and utilizes a drum for storage of list structure. The paging techniques described allow utilization of this large, but slow, drum memory with a surprisingly small time penalty. These techniques are applicable to the design of efficient list processing systems embedded in time-sharing systems using paging for memory allocation. (Author)

AD-632 731 **Field 9B, 12B**
CFSTI Prices: HC$2.00 MF$0.50
RCA Labs., Princeton, N. J.
THRESHOLD LOGIC.
Interim rept. 1 Oct 64-30 Sep 65,
by Kenneth R. Kaplan and Robert O. Winder. 29 Oct 65, 51p Special scientific-1
Contract AF 19(628)-4789,
Proj. AF-5632,
Task 563202
AFCRL 66-117

Descriptors: (*Computer logic, Analysis), Linear, programming, Synthesis, Decision theory, Gates (Circuits), Electrical networks.

Identifiers: Threshold logic.

The report has four independent sections. (1) 'Test-Synthesis Evaluation' reports a statistical study of a family of linear-programming test-synthesis procedures; a 'best' method is definitely established. (2) 'Symmetry Types for Threshold Logic' is a tutorial expositon including a careful development of the Goto-Takahasi self-dual type ideas. (3) 'Best Threshold Gate Decisions' reports a comparison, on the 2470 7-argument threshold function representatives, of seven different methods of approximating weights on the basis of Chow parameters; the earlier work with a geometric interpretation is shown best. (4) 'Threshold Gate Networks' reviews the previously discussed 2-algorithm in geometric terms, describes our FORTRAN implementation of it, and reports an experiment which suggests that only one in fifteen five-argument functions is 2-realizable. (Author)

AD-632 972 **Field 9B, 12B**
CFSTI Prices: HC$2.00 MF$0.50
Research Analysis Corp., McLean, Va.
CONVERSION OF LIMITED-ENTRY DECISION TABLES TO OPTIMAL COMPUTER PROGRAMS I. MINIMUM AVERAGE PROCESSING TIME.
Technical paper,
by Lewis T. Reinwald, and Richard M. Soland.
Feb 66, 29p RAC-TP-197
Contract DA-44-188-ARO-1

Descriptors: (*Programming (Computers), *Compilers), (*Decision theory, Programming (Computers)), Special functions (Mathematical), Algorithms, Optimization, Data processing systems, Digital computers, Operations research.

This paper begins with a brief description of limited-entry decision tables and then discusses alternate expressions for them as sequential testing procedures for computer implementation and as Boolean functions. An algorithm is developed that, in a finite number of steps, will convert any given limited-entry decision table into an 'optimal' computer program, (i.e., one with minimum average processing time). The algorithm is more general than procedures previously developed and guarantees optimality of the resultant computer program. Previous procedures required two distinct steps and gave no assurance of overall optimality. Computer implementation of the algorithm is also discussed. (Author)

AD-633 002 **Field 9B, 6D**
CFSTI Prices: HC$4.60 MF$0.50
System Research, Ltd., Richmond (England).
THE CYBERNETICS OF EVOLUTIONARY PROCESSES AND OF SELF ORGANISING SYSTEMS,
by Gordon Pask. Sep 61, 48p
Contract AF 61(052)-402
Prepared for presentation at Congress of the International Association of Cybernetics (3rd), Namur (Belgium) in September 1961.

Descriptors: (*Cybernetics, *Bionics), (*Automata, Cybernetics), Great Britain.

Identifiers: Self-organizing systems.

AD-633 003 **Field 9B, 5H**
CFSTI Prices: HC$3.60 MF$0.50
System Research, Ltd., Richmond (England).
THE LOGIC AND BEHAVIOR OF SELF ORGANIZING SYSTEMS AS ILLUSTRATED BY THE INTERACTION BETWEEN MEN AND ADAPTIVE MACHINES,
by Gordon Pask. 1962, 35p
Contract AF 61(052)-402
Prepared for presentation at International Symposium on Information Theory Brussels 1962 Belgium.

Descriptors: (*Man-machine systems, *Automata), Computer logic, Artificial intelligence, Great Britain.

Identifiers: Self-organizing systems.

In this paper the author discusses the interaction between a human being and an adaptive machine. It is argued that a stable, coupled system is necessarily a self organising system. Practical and theoretical considerations are reviewed in terms of those adaptive machines used in a specific application; namely, the automatic instruction of skills. A simple laboratory system is described in detail. Finally, he considers the behaviour of larger and more realistic systems. (Author)

AD-633 029 **Field 9B**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
TWO-ADDRESS COMPUTERS: PROGRAMMING AND PROBLEM SOLUTION,
by T. S. Latysheva. 17 Feb 66, 206p FTD-TT-65-402
TT 66-61263
Unedited rough draft trans. of mono. Programmirovanie i Reshenie Zadach na Dvukhadresnykh Mashinakh, Moscow, 1963 184p.

Descriptors: (*Programming (Computers. USSR), (*Digital computers, Programming (Computers)), (*Problem solving, Programming (Computers)), Binary arithmetic, Computer logic, Control sequences, Compilers, Flow charting, Instruction manuals, Data processing systems.

Identifiers: Minsk computers.

This report contains a detailed presentation of programming examples for two-address machines with provision for their special characteristics. General information on programming is given first. Various number systems are considered, and the operation codes for the M-3 and Minsk-1 computers are given. Fundamental programming methods are presented for fixed-point two-address computers, and a method is described for conversion to a floating-point system. Some information is given on the principle of logical-scheme construction. The concluding chapters of the report deal with debugging and computer solution of problems. The Appendix gives certain technical characteristics of the M-3 and Minsk-1 computers, as well as subroutines for translation of numbers from the decimal notation system to binary and back for the M-3 and Minsk-1. A large number of example programs are examined to promote mastery of the material.

AD-633 103 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.

COMPUTER TECHNOLOGY: ANNOTATED BIBLIOGRAPHY.
Rept. no. 4 on ATD work assignment no. 81,
by Joseph J. Podoski, and Vladimir Podpaly. 25 Jan 66, 36p ATD-66-12
TT 66-61269
Based on Soviet open-sources pub. 1961-64. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Bibliographies, *Computers), USSR.

This bibliography was compiled from Soviet open sources published 1961-1964. It is the fourth in a series of reports reviewing Soviet developments in computer technology. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 254 entries are arranged alphabetically by author within each of the years covered (46 for 1961, 59 for 1962, 59 for 1963, and 90 for 1964). A list of the journals scanned in preparation of the bibliography is included. Other information covered: transistorized amplifier, binary codes, magnetic tape, problem programming, algorithm coding and programming, wide-band thyrite multiplying and dividing device, ferromagnetic films, pneumatic circuits, parametric resonators with ferrite cores, magnetic drum storage unit, transistorized precision integrator, analog-digital converter, potentiometer, photoelectronic decoder, pulse divider, magnetic circuit, amplifiers, differentiating and integrating circuits, full-key relay computer, digital-to-analog converter, tunnel-diode detector, nonlinear programming, trigger circuit, flip-flops, functional converter, ferrite storage unit, memory unit, delay line, encoder, and printing device. (Author)

AD-633 242 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Bolt, Beranek and Newman, Inc., Cambridge, Mass.
FORMAT-DIRECTED LIST PROCESSING IN LISP.
Interim rept.,
by Daniel G. Bobrow, and Warren Teitelman. Apr 66, 33p BBN-1366, Scientific-3
Contract AF 19 (628)-5065, ARPA Order-627, Proj. AF-8668
AFCRL 66-302
See also AD-632 669.

Descriptors: (*Programming languages, Programming (Computers)), Pattern recognition, Algorithms, Mathematical logic, Transformational grammars.

Identifiers: LISP, Strings (Linguistics).

This report describes a notation and a programming language for expressing, from within a LISP system, string transformations such as those performed in COMIT or SNOBOL. A simple transformation (or transformation rule) is specified by providing a pattern which must match the structure to be transformed and a format which specifies how to construct a new structure according to the segmentation specified by the pattern. The patterns and formats are greatly generalized versions of the left-half and right-half rules of COMIT and SNOBOL. For example, elementary patterns and formats can be variable names, results of computations, disjunctive sets, or repeating subpatterns; predicates can be associated with elementary patterns which check relationships among separated elements of the match; it is no longer necessary to restrict the operations to linear strings since elementary patterns can themselves match structures. The FLIP language has been implemented in LISP 1.5 and has been successfully used in such disparate tasks as editing LISP functions and parsing Kleene regular expressions. (Author)

AD-633 266 **Field 9B, 13B, 13C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
COMPUTER PROGRAM AND DESIGN VALUES.
Final rept. Jun 63-Jun 65,
by J. J. Hromadik, and G. D. McDougall. May 66, 48p TR-R-133S
Proj. Y-R011-01-01-057
Supplement to Technical Report R-133: Column Strength of Long Piles.

Descriptors: (*Programming (Computers), Design), (*Loading (Mechanics), *Foundations (Structures)), Concrete, Mechanical properties.

A 1620 IBM computer program was written in FORTRAN to determine the ultimate load for concentrically loaded, concrete, long piles. The piles were of three basic cross sections: circular, octagonal, and square. The theoretical evaluation of the ultimate load was made by using the tangent modulus in the generalized Euler formula, as originally presented in AD-258 262. Presented in this supplement are the computer program and the computer results in the form of tables giving the ultimate load for various column slenderness ratios. (Author)

AD-633 364 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
Oregon State Univ., Corvallis. Computer Center.
PROGRESS REPORT ON THE NEBULA COMPUTER.
Document,
by W. A. Nickodemus, J. A. Boles, G. A. Hoselton, P. T. Rux, and D. B. Shepard. 14 Jan 66, 84p cc-66-1
Contract Nonr-1286 (11)

Descriptors: (*Digital computers, Design), Delay lines, Glass, Computer storage devices, Computer logic, Relaxation oscillators, Gates (Circuits), Teletype systems, Reading machines, Programming (Computers).

Identifiers: NEBULA computer, Computer consoles, Computer words.

A medium speed, serial digital computer was constructed using glass delay lines circulating at 22 mc. as memory. An arrangement of information within the 22 mc. memory allows a simple interface with the 340 kc. arithmetic unit, which results in an effective zero latency time and provides possibilities for an associative memory. The arithmetic unit has a command structure similar to large parallel machines and uses flip-flop arithmetic and control registers throughout. All hardware development has been aimed toward the concept of easy modification, elaborate console controls for effective man-machine interaction, and low cost. (Author)

AD-633 373 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
COMPUTER TECHNOLOGY: COMPILATION OF ABSTRACTS.
Rept. no. 5 on ATD work assignment no. 81,
by Boris Doncov. 17 Feb 66, 42p ATD-66-19
TT 66-61367
Based on Soviet open sources pub. 1965. See also AD-633 103.

Descriptors: (*Computers, *Bibliographies), Design, Scheduling, Computer logic, Microminiaturization (Electronics), USSR.

The 35 abstracts are arranged alphabetically by author within each of the following categories: components, design, applications, and associated systems. A recent review of two Soviet articles on homogeneous microelectronic structures is included in the Appendix. A bibliography is presented at the end of the report.

AD-633 425 **Field 9B, 15G**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
A GENERAL SIMULATION ROUTINE,
by Michael A. Hogan. 15 Mar 66, 46p
USNRDL-TR-994
Proj. SF-011-05-12,
Task 0506

Descriptors: (*Programming (Computers), *Simulation), (*War games, Simulation), Model theory, Compilers.

A general computer program which controls input, storage and event sequencing for any event-store simulation (war game) is described. To simulate from a particular model, a user writes a subroutine embodying the rules of the model. The subject program is written in FORTRAN II and FAP and is compatible with the IBM 704, 7090 and 7094. (Author)

AD-633 426 **Field 9B, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Picatinny Arsenal, Dover, N. J. Engineering Sciences Lab.
A ONE-VELOCITY Sn COMPUTER CODE.
Technical rept.,
by R. Kesselman. Jun 66, 50p TR-3247

Descriptors: (*Programming (Computers), *Neutron transport theory), Neutron flux, Numerical methods and procedures, Approximation (Mathematics), Neutron scattering.

A set of calculations on the angular and spatial distribution of monoenergetic neutrons in a uniform slab was made using the S sub n method. The basic S sub n technique is explained in detail. A FORTRAN II computer code for the IBM 7090 for the distribution of monoenergetic neutrons in plane geometry using the S sub n approximation is presented. Absorption and isotropic elastic scattering are taken into account. Calculations were conducted to study the effect on the neutron distribution of varying the space mesh size and the number of angular intervals. The results indicated that an S sub 8 approximation and a space mesh increment of less than or equal to 0.2 mean free path will give sufficiently good accuracy for calculation of the flux. Graphs and tables showing the variation of flux, inverse relaxation distance, and linear extrapolation distance with c (the ratio of the scattering to the total macroscopic cross sections) are presented. (Author)

ANL-7109 **Field 9B, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
A CHECKER-PLAYING PROGRAM FOR THE IPL-VC COMPUTER,
by W. R. Cowell and M. C. Reed. Oct 65, 14p
Contract W-31-109-eng-38

Descriptors: (*Game theory, Programming languages), (*Programming (Computers), Input-output devices).

ANL-7129 **Field 9B, 12B**
CFSTI Prices: HC$3.00 MF$0.50
Argonne National Lab., Ill.
APPLIED MATHEMATICS DIVISION SUMMARY REPORT.
Rept. for 1 Jul 64-30 Jun 65.
30 Jun 65, 53p
Contract W-31-109-eng-38

Descriptors: (*Mathematical programming, Digital computers), (*Programming (Computers), Nuclear engineering).

IDO-17125 **Field 9B, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
WIGLE-40, A TWO-GROUP, TIME-DEPENDENT DIFFUSION THEORY PROGRAM FOR THE IBM 7040 COMPUTER,
by M. E. Radd. Dec 65, 61p
Contract AT (10-1)-205

Descriptors: (*Neutron transport theory, Programming (Computers)), (*Programming (Computers), Neutron flux).

K-DP-515 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge Gaseous Diffusion Plant, Tenn.
TABLE LOOK-UP TECHNIQUES FOR COMPUTER PROGRAMMING,
by C. E. Price. 13 May 65, 21p
Contract W-7405-eng-26

Descriptors: (*Programming (Computers), Tables), (*Tables, Data processing systems).

N66-16050 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
TELEMETRY DATA PROCESSING,
Sep 65, 54p NASA-TM-X-55351, X-564-65-384

Descriptors: *Data processing.

N66-18335 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
AUTOMATIC FLOW CHART DESIGN,
by G. Hain and K. Hain. 1965, 21p NASA-TM-X-56174
Presented at the Natl. Conf. of the Assoc. for Computing Machinery, (20th) Cleveland, Aug 24-26, 1965.

Descriptors: *Fortran, *Chart, *Computer program.

ORNL-3877 **Field 9B, 20H, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
FORTRAN PROGRAMS FOR THE CLEBSCH-GORDAN AND RACAH COEFFICIENTS AND THE NINE-J SYMBOL,
by Taro Tamura. 1964, 10p
Contract W-7405-eng-26

Descriptors: (*Programming languages, Optimization), (*Nuclear physics, Programming (Computers)).

ORNL-3881 **Field 9B, 20H, 12A**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
A PROGRAM TO COMPUTE THE CLASSICAL DEFLECTION FUNCTION,
by M. H. Lietzke and M. G. Menendez. Feb 66, 44p
Contract W-7405-eng-48

Descriptors: (*Programming (Computers), Molecular beams), (*Molecular beams, Deflection).

SC-DC-65-1132 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
A PRECISION ANALOG MEMORY WITH NON-DESTRUCTIVE READOUT USING MULTIAPERTURE FERRITE CORES,
by Andrew C. Wilken. Jan 65, 36p CONF-650403-1
Contract AT (29-1)-789
Presented at International Conference on Nonlinear Magnetics, Washington, D. C.

Descriptors: (*Magnetic cores, Input-output devices), (*Switching circuits, Magnetic core storage).

SCL-DC-64-130 **Field 9B**
CFSTI Prices: HC$5.00 MF$1.00
IIT Research Inst., Chicago, Ill.
APT NUMERICAL DESCRIPTION STUDY.
Final rept.,
by M. M. Gutterman. 21 Aug 64, 176p
Contract AT (11-1)-578

Descriptors: (*Drafting, Automatic), (*Special funtions (Mathematical), Drafting).

ACF-5 See Field 7D

AD-632 667 See Field 17B

AD-632 741 See Field 5I

AD-632 805 See Field 18C

AD-632 806 See Field 9C

AD-632 808 See Field 20L

AD-632 898 See Field 12A

AD-632 997 See Field 17I

AD-633 047 See Field 8B

AD-633 258 See Field 5I

AD-633 288 See Field 9A

AD-633 304 See Field 8K

AD-633 310 See Field 14B

BNL-966 See Field 18I

IDO-17114 See Field 18K

LA-3422 See Field 20D

NAA-SR-MEMO-10632 See Field 18K

ORNL-3889 See Field 7A

SC-RR-65-396 See Field 18H

9C. ELECTRIC AND ELECTRONIC ENGINEERING

AD-632 806 **Field 9C, 6D, 20I, 20H, 20L, 9B**
CFSTI Prices: HC$3.00 MF$0.75
California Univ., Berkeley. Electronics Research Lab.
JOINT SERVICES ELECTRONICS PROGRAM.
Final rept., 16 Mar 65-15 Feb 66,
by D. J. Angelakos and J. R. Whinnery. 15 Mar 66, 64p ERL-66-4
Grant AF-AFOSR-139-65,
Proj. AF-4751,
AFOSR 66-0864

Descriptors: (*Electronics, Scientific research), Armed forces research, Armed Forces (United States), Bionics, Artificial intelligence, Memory, Dielectric properties, Electron beams, Photoelectric effect, Plasma physics, Proteins, Low-temperature research, Cyclotrons, Cyclotron waves, Lasers, Optical phenomena, Nonlinear systems, Infrared phenomena, Backscattering, Slot antennas, Dipole antennas, Electron microscopy, Field emission, Semiconductors, Solid state physics, Computers.

The Electronics Research Laboratory (ERL), University of California, Berkeley, received support for its basic research program for the Joint Services Electronics Program (JSEP), sponsored by the Departments of Air Force (Office of Scientific Research), Army (Army Research Office), and Navy (Office of Naval Research). The ERL utilizes JSEP support to cover the basic core of laboratory research. The JSEP is instrumental in supporting basic research in every research area of the laboratory which includes: Bioelectronics, Electron Streams and Interactions, Plasmas, Quantum and Optical Electronics, Radiation and Propagation, Scanning Electron Microscopy, Semiconductor Electronics and Systems and Computer Sciences.

N66-10047 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Daytona Beach, Fla. Electronic Simulation Unit.
SINGLE PARAMETER TESTING.
Final rept. pt 3. add,
by J. T. Sterling. Sep 65, 18p 65-SIMAR-90/7
Contract NAS-8-11715
NASA CR-67599

Descriptors: *Nonlinear system, *Sampling.

N66-15821 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Honeywell, Inc., St. Paul, Minn. Research Dept.
OPTIMAL STABILIZATION OF NONLINEAR DYNAMICAL SYSTEM,
by D. L. Lukes. Oct 65, 25p Rept. no. 1546-FTR-3
Contract NAS8-5222
NASA CR-69573

Descriptors: *Nonlinear feedback, *Optimal control, *Partial differential equation, *Closed loop system, *Dynamic stability.

N66-16980 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
Villanova Univ., Pa.
A BIBLIOGRAPHY ON DIGITAL COMPUTER-AIDED CIRCUIT ANALYSIS AND DESIGN,
by T. Yang. 1965, 28p
Grant NGR-39-023-004
NASA CR-70211

Descriptors: *Digital computer, *Electric network, *Logic circuit, *Bibliography.

AD-459 421 See Field 9A

AD-632 839 See Field 9A

AD-632 855 See Field 17B

BDX-613-67 See Field 14B

9D. INFORMATION THEORY

AD-633 022 **Field 9D**
CFSTI Prices: HC$1.00 MF$0.50
Cruft Lab., Harvard Univ., Cambridge, Mass.
ON THE UNIQUE DECODABILITY OF CODES.
Interim technical rept.,
by John D. Lipson. Apr 66, 11p TR-498
Contract Nonr-1866 (16),
Proj. NR-372-012

Descriptors: (*Decoding, *Coding), Tests, Sequences, Information theory, Algorithms.

A simplication of the Sardinas and Patterson test for unique decodability is given. It is shown that duplicate sequences of code symbols generated by that algorithm can be omitted, resulting in a more efficient algorithm with respect to computer storage and time required to carry out the test. This simplicity is employed in deriving an improved upper bound on the number of sequences of code symbols that must be generated in order to determine whether or not a given code is uniquely decodable. This easily computed bound serves as a measure of the amount of computer storage and time required to carry out the test for any given code. (Author)

AD-633 048 **Field 9D**
CFSTI Prices: HC$1.00 MF$0.50
Cruft Lab., Harvard Univ., Cambridge, Mass.
NONLINEAR TRANSFORMATIONS OF RANDOM PROCESSES.
Interim technical rept.,
by Norman Abramson. Apr 66, 21p TR-497
Contract Nonr-1866 (16),
Proj. NR-372-012

Descriptors: (*Stochastic processes, *Information theory), Transformations (Mathematics), Bandwidth, Band-pass filters, Detectors.

This paper provides a general method of calculating the mean square bandwidth of an arbitrary zero-memory nonlinear transformation of a stationary random process. The method is valid when the original process is non-Gaussian as well as Gaussian and when the original process is an arbitrary combination of other random processes. It can be used to determine the mean square bandwidth of the transformed process either before or after that process is passed through a bandpass filter. Five examples of the application of this method are provided simplifying and generalizing known results, as well as providing new results. (Author)

AD-633 144 **Field 9D, 17B, 9F, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Mitre Corp., Bedford, Mass.
THE USE OF RESETTABLE INTEGRATORS OR CONVENTIONAL FILTERS IN TIME-DIVISION DATA TRANSMISSION SYSTEMS,
by Bertram M. Hadfield, and Ronald T. Herman.-
May 66, 43p TM-3836, TM-3836, Rev-1
Contract AF 19 (628)-5165,
Proj. AF-705C
ESD TR-65-409

Descriptors: (*Integrators, Data transmission systems), (*Low-pass filters, Data transmission systems), (*Data transmission system, *Information theory), Noise (Radio), Signal-to-noise ratio, Sampling, Integrated circuits, Delay circuits, Timing circuits, Demodulators, Telemeter systems.

Identifiers: Time-division switching.

This report establishes the 'effective noise power bandwidths' and 'noise reduction factors' of a restable integrator and of conventional passive lowpass filters. It then discusses the use of the resettable integrator with its necessary sample and hold circuit, as compared to the use of a passive lowpass filter which follows the receiver demodulator in time-division data transmission systems, such as telemetry links. It is concluded that since the overall lowpass bandwidth is determined by the conventional output lowpass filter necessary for removing the sampling 'noise' (quantum steps), then any other filter device is redundant, provided the demodulator does not sensibly alter the statistical properties of the input random noise. As a germane and highly important side issue, a more logical method for selecting the sampling rate in time-division systems is also discussed. (Author)

AD-633 432 **Field 9D**
CFSTI Prices: HC$3.60 MF$0.50
Diamond Ordnance Fuze Labs., Washington, D. C.
MULTICORRELATOR ANALYSIS: THE EFFECT OF 'CENTER CLIPPING'.
Technical rept.,
by Clyde Morrison, and P. R. Karr. 1 Feb 55, 32p TR-153
Proj. DOFL-5140

Descriptors: (*Correlation techniques, *Information theory), Signals, Signal-to-noise ratio, Noise, Demodulation.

The effect of adding a symmetrical bias to a previously proposed system of detecting a signal in noise is analyzed. The analysis is facilitated by the use of a proposed figure of merit for detecting signals in noise. In general, the effect of a given bias appears to increase the detectability for high signal to noise ratios, and to decrease it for small signal to noise ratios. Details are given in a number of curves and tables. (Author)

N66-17324 **Field 9D**
CFSTI Prices: HC$2.00 MF$0.50
Wyoming Univ., Laramie. Natural Resources Research Inst.
SIPLIC FORMS OF HOURLY PRECIPITATION DATA -CASPER, CHEYENNE, LANDER, SHERIDAN, 1949-1951,
by J. C. Bellamy and A. C. Munari. Aug 65, 32p
Grant NsG-658
NASA CR-70399

Descriptors: *IBM 1620 computer, *Information processing, *Precipitation, *Meteorological station, *Rain gauge.

AD-632 735 **See Field 5J**

AD-633 105 **See Field 5A**

AD-633 351 **See Field 17I**

AD-633 393 **See Field 12A**

9E. SUBSYSTEMS

AD-632 809 **Field 9E**
CFSTI Prices: HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
ON THE THEORY OF SCATTERING BY AN ARBITRARY ARRAY OF FINITE LENGTH PARALLEL WIRES,
by Gary A. Thiele. 1 Feb 66, 33p Rept. no. 1522-19
Contract N123 (953)-31663A

Descriptors: (*Ship antennas, *Antenna radiation patterns), (*Electric wire, Electric fields), Cylindrical bodies, Theory, Series, Fourier analysis, Scattering, Programming (Computers), Electromagnetic fields.

Identifiers: SCATRAN.

It has been shown previously (AD-443 833, AD-463 370, AD-467 888) that a continuous cylindrical metallic surface could be approximated by an array of infinitely long thin wires in order to obtain the far-zone scattered field. Such a technique found useful application in predicting the far-field pattern in the horizontal plane of a thin vertical antenna near a vertical cylindrical scatterer in many, but not all, situations. For instance, valid results could be obtained only if the scatterer was on the order of twice as tall as the antenna, and even then only in the azimuthal plane. As a result it was decided to use wires of finite instead of infinite length to approximate metallic cylinders of finite height. Since the current on each finite wire is non-uniform, it is necessary to represent the current by a Fourier series, the coefficients of which are determined by forcing the total tangential electric field to vanish at several points along each wire. This generates a system of linear equations which can readily be solved on a digital computer for the Fourier coefficients. Some representative calculated and experimental results are presented which show the general validity of the approach. In addition, methods for substantially reducing the running time of the program on the computer are explained. (Author)

AD-632 928 **Field 9E, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Hamilton Standard Div., United Aircraft Corp., Broad Brook, Conn.
MICROBONDS FOR HYBRID MICROCIRCUITS.
Progress rept. no. 7, 1 Aug-31 Oct 65,
by P. R. Amlinger and S. L. Sherman. Apr 66, 88p HSER-3135
Contract DA-36-039-AMC-03742 (E),
Proj. DA-1P6-22001-A-057,
Task 1P6-22001-A-05703
ECOM 03742-7
See also AD-631 288.

Descriptors: (*Miniature electronic equipment, *Bonding), (*Circuit interconnectors, Bonding), Microminiaturization (Electronics), Wire, Gold, Metal films, Chromium, Nickel, Welds, Aluminum compounds, Oxides, Sapphires, Silicon, Copper, Resistance (Electrical), Weldability, Ultrasonic welding.

Mechanical strengths of Type E (0.001 inch Au wire resistance welded to Au/Cr films on Vycor, Type G (0.001 inch Au wire resistance welded to Au/Cr films on glazed alumina), and Type A'2 (0.002 inch Au wire resistance welded to Au/Cr films on sapphire) microbonds were evaluated. The reliability goal of an expected failure of 3 bonds per 1000 at a 90% confidence level was not met. However, 95% of the failures can be attributed to poor film adhesion. Electrical resistance measurements on Bond Types E, F, G, H, A'1 and A"1 showed that all bond types met the contractual goal of SCL-7746A. After thermal shock, only the Type H bonds increased in resistance by more than 10%, the reliability goal. The pull strengths were somewhat lower (approximately 11 per cent lower in the worst case) after thermal cycling. The initial weld schedule development for resistance welding of goldplated nickel riser wires to Ni/Au/Cr films on alumina (Type V microbonds) indicated that much stronger welds were obtained than with copper riser wires. The shear pull strength of the gold-plated nickel riser wire bonds was near the pull strength of the wire itself. (Author)

AD-633 100 **Field 9E**
CFSTI Prices: HC$4.00 MF$0.75
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.
BROADBAND OMNIDIRECTIONAL ANTENNAS.
Technical memo.,
by Marvin L. Wahl. 30 Nov 65, 113p EDL-M890
Contract DA-28-043-AMC-00379 (E)

Descriptors: (*Omnidirectional antennas, Broadband), Performance (Engineering), Spiral antennas, Conical antennas, Log periodic antennas, Antenna configurations, Antenna radiation patterns, Polarization, Tuning devices, Loop antennas.

The report summarizes the research and development work performed in the area of small, broadband omnidirectional antennas. The specific antennas involved have been the spiral conical and bi-

conical, biconicals with polarizing grids placed in the aperture, the aerodynamic discone, and an omnidirectional form of the log-periodic. Newly developed techniques are described, including varactor-tuning the hula hoop antenna to extend the effective bandwidth and the development of a computer program to yield the precise configuration of matching networks to be used with wideband monopoles. (Author)

AD-633 117 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
LINEAR CLASS B AUDIO AMPLIFIER OUTPUT-POWER CAPABILITY; ANALYSIS OF LOAD-IMPEDANCE AND WAVEFORM EFFECTS.
Interim rept.,
by Wilmer M. Lawson, Jr. 13 Apr 66, 21p NRL-6379
Proj. Bu Ships-SF-101-03-18-8134

Descriptors: (*Audio amplifiers, Analysis), Electrical impedance, Waveform generators.

Large amounts of electrical power at audiofrequency are usually provided by some form of class B electronic amplifier. Unfortunately, changes in load impedance and in waveform can result in very large reductions in the output-power capability of such amplifiers. The design equations for class B amplifiers are developed with respect to impedance and signal waveshape. Manipulation of the equations leads to proof that class B amplifier operation with any signal waveshape can be assumed to be the same as operation with a sine wave of the same root-mean-square value. Therefore, once the sine-wave capability of a class B amplifier is determined, its capability for other waveshapes is determined by application of a simple derived multiplication factor. The sine-wave capability of class B amplifiers has been determined and presented in the form of graphs of power versus magnitude of impedance for fixed power factors and device peak-voltage capabilities. In general, the optimum sine-wave-output capability is determined as the power-dissipation capability of each device multiplied by 4.93, provided the current limit is not exceeded. The actual output capability will be reduced in magnitude by load and signal effects and system efficiency. This reduction is of the order of ten for loads with power factor of 0.7 and impedance swing of 4:1 and for device efficiency of 70 percent and circuit efficiency of 92 percent. For signals other than sine waves, the sine-wave average-power capability is then further reduced and is determined, in the worst case, by multiplying the sine-wave capacity by two and dividing by the square of the crest factor. (Author)

AD-633 243 **Field 9E, 9A**
CFSTI Prices: HC$2.00 MF$0.50
Wisconsin Univ., Madison. Dept. of Electrical Engineering.
WAVEGUIDE, WAVEGUIDE CIRCUITS AND ANTENNA RESEARCH STUDY.
Quarterly progress rept. no. 4, 1 Jun-31 Aug 65,
by Elmer H. Scheibe. 30 Sep 65, 27p
Contract DA-36-039-AMC-02261 (E),
Proj. DA-3A99-25-004

Descriptors: (*Antennas, *Wave transmission), (*Cavity resonators, Waveguides), Circuits, Microwave equipment, Beams (Electromagnetic), Waveguide couplers, Filters (Electromagnetic wave).

A study of the measuring system was made using a Hewlett-Packard 851A/8551A Spectrum Analyzer. It was found that under certain conditions a high frequency modulation was present in the output of the stabilized klystron and further that the Dymec stabilizer often locked onto one of the modulation side bands. The largest single loss within the beam waveguide resonator was due to the coupling holes. When the coupling hole loss was accounted for, using an analysis by McCumber, the measured and predicted Q of the beam waveguide resonator operating at 35 GHz were in reasonable agreement. The additional measurements made on the parallel plane resonator indicated that the coupling hole loss was also an important factor in determining the Q. The coupling hole loss cannot be accounted for in the case of the parallel plane resonator since the field distribution within the resonator is not known. It also appears that the Q of the parallel plane resonator depends on the diameter of the end plates. (Author)

AD-633 254 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Litton Systems, Inc., Minneapolis, Minn. Applied Science Div.
LIGHTWEIGHT FLEXIBLE VHF TREE-TOP ANTENNA WITH INFLATABLE MAST.
Final rept. 1 Jul 64-31 Jan 66,
by G. A. Wales, H. P. Raabe, and L. E. Nelson.
26 Feb 66, 100p Rept. no. 2940
Contract DA-28-043-AMC-00335 (E)

Descriptors: (*Antenna arrays, Very high frequency), Airborne, Portable, Weight, Flexible, Antenna masts, Dipole antennas, Balloons, Inflatable structures, Military requirements, Jungles.

This program was a research and development effort to improve the portability of VHF antenna systems for military field use. A variety of devices were fabricated which strive to provide an evaluator with meaningful parameters of sizes, weights, durabilities, effectiveness, overall acceptability, etc. Highly mobile means of providing respectable communication ranges in jungle areas are of prime importance. A basic guideline used in this program was an adaptability of techniques or devices for more than one application. For instance, the 'J' antennas are used interchangeably with their chosen elevating device, be it mast or AEROKITE. The same inflation fitting is used on the mast and on the AEROKITE. Although the electrical devices are designed to be compatible with the elevating devices, they have not been incorporated together as unseparable components. It may be desirable to do so in future applications. Both elevating means are inflatables and require some adaptability by the user. One must realize that a lightweight system will lack durability and be subject to wind loadings. Where portability and effectiveness are of great importance, this trade-off is readily acceptable. (Author)

AD-458 536 **See Field 9A**

AD-632 794 **See Field 20N**

AD-632 848 **See Field 9A**

AD-632 931 **See Field 9A**

AD-633 025 **See Field 9F**

AD-633 144 **See Field 9D**

AD-633 272 **See Field 4A**

AD-633 280 **See Field 20I**

9F. TELEMETRY

AD-633 025 **Field 9F, 9E, 22B**
CFSTI Prices: HC$2.00 MF$0.50
New Mexico State Univ., University Park. Physical Sciences Lab.
TELEMETRY ANTENNA FOR AE. 7.347 INFLATABLE SPHERE EXPERIMENT,
by D. G. Henry, and H. W. Haas. Dec 65, 45p
Scientific-6
Contract AF 19 (628)-3229,
Proj. AF-7659, 7043,
Task 765901
AFCRL 66-201

Descriptors: (*Telemetering antennas, *Inflatable structures), (*Antenna radiation patterns, Telemetering antennas), Sounding rockets, Payload, Release mechanisms, Spheres, Meteorological instruments, Electrical impedance.

Radiation pattern and impedance data are presented for two different telemetry antenna types to be used on a one meter sphere. The sphere is to be ejected from a NIRO rocket. The final design must fit in a metal strut contained within the sphere. The Model 24.004 antenna is the antenna selected. This antenna was tested for radiation pattern, impedance, and mechanical stability. Data is presented in graphs and photographs. (Author)

N66-10422 **Field 9F**
CFSTI Prices: HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-35, VOLUME III FOR THE PERIOD JULY 1, 1965 TO WORK.
30 Sep 65, 80p JPL-SPS-37-35, Vol. III
Contract NAS7-100
NASA CR-67728

Descriptors: *Communication system.

N66-15786 **Field 9F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Goddard Space Flight Center. Greenbelt, Md.
COMMUNICATION THEORY APPLIED TO ANTENNA SYSTEMS,
by W. Welch. Nov 65, 36p NASA-TM-X-55347, X-525-65-469

Descriptors: *Fourier analysis, *Antenna, *Communication theory, *Linear circuit.

N66-17323 **Field 9F**
CFSTI Prices: HC$4.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THEORY AND PRACTICAL DESIGN OF PHASE-LOCKED RECEIVERS, VOLUME I,
by R. C. Tausworthe. 15 Feb 66, 115p JPL-TR-32-819
Contract NAS7-100
NASA CR-70395

Descriptors: *Receiver, *Servo loop, *Systems design, *Tracking antenna, *Phase lock.

N66-18337 **Field 9F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
AN AUTOMATIC, ON LINE TELEMETRY PROCESSING SYSTEM,
by R. G. Holmes and H. R. Stagner. 1964, 21p
NASA-TM-X-56539
Presented at the 1965 Intern. Space Electron. Symp., Miami Beach, Fla., Nov 2-4, 1965.

Descriptors: *Nimbus satellite, *On-line programming, *Telemetry.

N66-18349 **Field 9F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
COMPARISON OF THE PERFORMANCE OF PCM AND PFM TELEMETRY SYSTEMS,
by C. J. Creveling. May 65, 26p NASA-TM-X-56575
Presented at The IEEE Intern. Space Electron. Symp., Miami, Fla., Nov 2-4, 1965.

Descriptors: *Bandwidth, *PFM telemetry, *Transmission efficiency, *Pulse code modulation (PCM).

AD-633 144 **See Field 9D**

PB-170 151 **See Field 5C**

10A. CONVERSION TECHNIQUES

AD-632 675 **Field 10A, 20D, 21E**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
EROSIVE ABRASION THEORY OF THE BLADE APPARATUS OF CENTRIPETAL TURBINES,
by A. I. Loshkarev. 1966, 22p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1M643324D-590
AERDL T-1833-66, TT 66-61242
K Teoriya Erosionnogo Isnosza Lopatochnogo Apparata Zentrostremitelinych Turbin, trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport n2 p134-46 1965.

Descriptors: (*Turbine blades, Erosion), (*Erosion, Abrasives), Turbines, USSR, Rheology, Particles, Particle size, Gas flow, Nozzles, Wear resistance.

An investigation was made of the laws governing the motion of solid particles in the flow portion of a centripetal turbine; an evaluation was made of the particle sizes which do not bring about erosional abrasion and some design modifications leading to minimization of such abrasion are indicated. (Author)

N66-10049 **Field 10A**
CFSTI Prices: HC$3.00 MF$0.75
Cook Electric Co., Dayton, Ohio.
TESTING AND EVALUATION OF NICKEL-CADMIUM SPACECRAFT-TYPE CELLS.
Semiannual technical rept, 1 Jan-1 Jul 65,
by I. F. Luke, and E. A. Roeger Jr. 1965, 94p
9PD-4667-1
Contract NAS-5-9073
NASA CR-67580

Descriptors: *Electrochemical cell, *Nickel-cadmium battery, *Spacecraft electronic equipment.

N66-10601 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Research Div.
RESEARCH AND DEVELOPMENT OF OPEN-CYCLE FUEL CELLS.
Quarterly progress rept no. 4, 15 Aug 65,
by R. Desai, G. Monette, and C. Williams. 15 Sep 65, 24p NAS-8-5392-QPR-004
Contract NAS8-5392
NASA CR-67802

Descriptors: *Computer program, *Digital computer, *Fuel cell, *Mathematical model, Power supply, *Weight factor.

N66-17306 **Field 10A**
CFSTI Prices: HC$6.00 MF$1.50
Pennsylvania Univ., Philadelphia. Power Information Center.
PROCEEDINGS OF THE FIFTH PHOTOVOLTAIC SPECIALISTS CONFERENCE. VOLUME I-ADVANCED SOLAR CELLS.
Dec 65, 271p PIC-SOL-209/6
Contract NASr-191
NASA CR-70168

Conf. held at NASA, Goddard Space Flight Center, Greenbelt, Md., 18 Oct 1965. Prepared for interagency Advanced Power Group.

Descriptors: *Solar cell, *Conference, *Photovoltaic effect.

N66-18338 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ADVANCED SOLAR CELL POWER SYSTEMS FOR SPACE,
by W. R. Cherry and L. W. Slifer, Jr. 1964, 17p
NASA-TM-X-56172
Presented at the Ann. Power Sources Conf. (19th), Atlantic City, May 18-20, 1965.

Descriptors: *Power supply, *Thermal stress, *Solar cell, *Weight.

N66-18378 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THERMAL ANNEALING OF RADIATION DAMAGED SILICON,
by P. H. Fang. 1965, 10p NASA-TM-X-56306

Descriptors: *Annealing, *Radiation effect, *Silicon.

TEI-855 **See Field 18B**

10B. POWER SOURCES

AD-632 700 **Field 10B**
CFSTI Prices: HC$1.00 MF$0.50
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Space and Defense Sciences Dept.
DESIGN OF HYDROGEN-OXYGEN CAPILLARY TYPE FUEL CELL.
Quarterly technical progress rept. no. 10, 1 Feb-30 Apr 66,
by L. S. Harootyan, Jr., and R. J. Chesner. 16 May 66, 25p
Contract AF 33 (615)-1185
See also AD-628 129.

Descriptors: (*Fuel cells, Design), Tests, Spaceborne, Storage, Performance (Engineering), Hydrogen, Oxygen, Thermal stresses.

A successful operational test of the Orbital Fuel Cell Package after 24 months of storage and after the severe shock and temperatures extremes experienced due to the abortive flight attempt demonstrated the extended storage capability and ruggedness of the capillary fuel cell. An operational test of Module Number 1 in May 1966 will complete the 90-day storage qualification test. Thermal-vacuum qualification testing cannot be started until fuel cell plates for the test modules are received and the modules can be assembled. (Author)

AD-633 246 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
Union Carbide Corp., Parma, Ohio.
MINIATURE HYDROGEN GENERATOR.
Quarterly rept. no. 3, 1 Dec 65-28 Feb 66,
by J. E. Rothfleisch, and Lawrence M. Litz. Apr 66, 43p
Contract DA-28-043-AMC-01375 (E),
Proj. DA-1C6-22001-A053,
Task 1C6-22001-A053-04
ECOM 01375-3
See also AD-628 499.

Descriptors: (*Gas generating systems, Hydrogen), (*Hydrogen, Fuel cells), (*Fuel cells, Gas generating systems), Jet engine fuels, Pyrolysis, Portable, Performance (Engineering).

An investigation was made of the feasibility of developing portable generators capable of producing sufficient hydrogen by thermal cracking of field available liquid hydrocarbon fuels to operate hydrogen-air fuel cells in the 10- to 200-watt power range. Experiments with JP-4 fuel-fired thermal cracking hydrogen generators indicate that interior baffle location and design strongly influences the hydrogen content of the product and the operating time before plugging. Operating time limitation may result from blockage either by the carbon laid down by the primary decomposition of the JP-4 at temperatures below 900C or by the carbon formed at temperatures above 1000-1100C when the methane by-product cracks. Operation of an alkaline fuel cell on the hydrogen-methane thermal cracking product indicates no adverse affect other than a slight lowering of the potential due to dilution of the hydrogen. Use of steel wool in the reactor has very effectively removed any sulfur in the product stream. Preliminary efforts at burner development have led to a very much quieter, more efficient burner unit than that utilized initially. Operation of the tube-furnace reactor at a pressure of two atmospheres showed no significant influence of the increased contact time resulting therefrom. (Author)

LA-3368 **Field 10B, 20I, 18L**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
NUCLEAR REACTOR MAGNETOHYDRODYNAMIC POWER GENERATION,
by Ralph S. Cooper, Lawrence A. Booth, R. J. Fries, P. G. Salgado, and W. E. Crowe. Aug 65, 47p
Contract W-7405-eng-36

Descriptors: (*Magnetohydrodynamic generators, Nuclear reactors), (*Energy conversion, Magnetohydrodynamics).

N66-15406 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
PROGRESS IN PHOTOVOLTAIC ENERGY CONVERSION,
by A. H. Smith. 1965, 50p NASA-TM-X-57120
Presented at the Intern. Energetics Conf., Rochester, N. Y., Aug 18-20 1965.

Descriptors: *Photovoltaic conversion, *Solar energy, *Energy conversion.

AD-632 847 **See Field 17G**

10C. ENERGY STORAGE

AD-458 472 **Field 10C**
CFSTI Prices: HC$2.60
Rocketdyne, Canoga Park, Calif.
HIGH-ENERGY BATTERY SYSTEM STUDY.
Quarterly progress rept. no. 5, 1 Jul-30 Sep 64,
by J. Farrar, R. Keller, C. J. Mazac, and M. M. Nicholson. 30 Sep 64, 25p Rept. no. R-5405-5
Contract DA-36-039-AMC-03201 (E),
Proj. DA-1C6-22001-A-053-02
See also AD-450 559.

Descriptors: (*Batteries ; components, Design), (*Primary cells, Design), Anodes (Electrolytic cells), Lithium, Lithium compounds, Bromides, Propenes, Carbonates, Sulfoxides, Cathodes (Electrolytic cells), Silver compounds, Oxides, Performance (Engineering),

Halocarbon plastics, Electrolytic cells, Battery separators, Electrolytes.

Identifiers: Dimethyl sulfoxide, Lithium bromide, Silver oxide, Organic batteries.

A new rectangular cell with more practical geometry and more uniform current density was constructed. Utilization efficiencies for lithium anodes were determined in this cell with lithium bromide in propylene carbonate and dimethyl sulfoxide as electrolytes. In the latter case., 90% efficiency was obtained. An improved electrode holder suitable for utilization measurements on powdered cathode materials was also developed and tested experimentally. The water absorbed by lithium bromide solutions in propylene carbonate and dimethyl sulfoxide during controlled exposure to moist air was determined, and the effect of this increase in water content on the behavior of silver oxide cathodes was investigated. Cathode performance is the greatest limitation to development of a complete cell with the desired energy density. (Author)

AD-632 717 **Field 10C**
CFSTI Prices: HC$3.00 MF$0.75
Yardney Electric Corp., New York.
DEVELOPMENT OF THE METAL-AIR BATTERY SYSTEM.
Quarterly technical rept. no. 1, 1 Jul-30 Sep 65,
by Allen Charkey. Apr 66, 64p
Contract DA-28-043-AMC-01614 (E),
Proj. DA-1C0-14501-A-34A,
Task 00
ECOM 01614-1
Rept. on Development of the high rate metal-air depolarized batteries.

Descriptors: (*Primary cells, Air), Anodes (Electrolytic cell), Cathodes (Electrolytic cell), Platinum, Silver, Catalysts, Metals, Oxygen, Polarization, Zinc, Magnesium, Aluminum, Barium, Calcium, Alkali metal compounds, Potassium compounds, Hydroxides, Porosity, Battery separators.

Performance characteristics of metal-oxygen couples were determined over the range of + 125 to -25F. Evaluation tests were conducted on oxygen electrodes to determine the voltage characteristics over the current density range of 16-800 ma/sq in. Both the silver- and platinum-catalyzed cathodes performed well, with the latter giving about 0.1 volt lower polarization than the former at equivalent current densities. Using the best silver and platinum air electrodes, Al/02, Ba/02, Ca/02, Mg/02, and Zn/02 cell systems were examined. For the first four anode metals, most of the investigation was of an exploratory nature. This consisted of a search for electrolytes compatible with both the anode and the cathode. Experimentation with the zinc-oxygen couple in an alkaline electrolyte gave the most favorable results. Flat voltage discharge curves were obtained at rates up to the 2C, (800 ma/sq in), at room temperature. An air flow study has been initiated to establish the optimum spacing and venting of adjacent cells. At the 2C rate with a 100 mil. spacing, the free convection of air, resulting from temperature change within the cell, was sufficient to provide the required amount of oxygen to the cathode. (Author)

AD-633 060 **Field 10C**
CFSTI Prices: HC$2.00 MF$0.50
Sonotone Corp., Elmsford, N. Y.
STANDARD LINE-BATTERY ASSEMBLY BB-610 ()/U NICKEL CADMIUM VENTED.
Quarterly rept. no. 2, 29 Oct 65-28 Jan 66,
by Raymond Nathe, John Herrmann, Arthur Fitchman, and Elmer D'Onofrio. Apr 66, 31p
Contract DA-28-043-AMC-01508 (E),
Proj. DA-1C6-22001-A-053,
Task 02
ECOM 01508-2
See also AD-631 271.

Descriptors: (*Storage batteries, Design), Nickel, Cadmium, Glass textiles, Containers, Tests.

Identifiers: Nickel - cadmium cells.

This report covers the research and development activities which have been directed towards the design of a 12-volt, vented, nickel-cadmium battery housed in a reinforced fiberglass container, and capable of surviving four-foot, free-fall drops. Based upon our test results, certain modifications on the container were made, subsequently followed by a new series of drop tests. These test results proved out the acceptability of the new modifications, since no significant damage to the container was found at the end of 26 completed drops. (Author)

N66-18319 **Field 10C**
CFSTI Prices: HC$3.00 MF$0.50
Unified Science Associates, Inc., Pasadena, Calif.
GASEOUS ELECTROLYTES FOR BATTERIES AND FUEL CELLS.
Quarterly rept. no. 5, 21 Aug-20 Nov 65,
by S. Naiditch. 1965, 53p
Contract NAS7-326
NASA CR-70581

Descriptors: *Sodium iodide, *Electrolysis, *Fuel cell, *Liquid ammonia.

N66-18341 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
NASA'S SPACECRAFT BATTERY EVALUATION PROGRAM,
by A. O. Apelt and E. R. Stroup. 1965, 18p
NASA-TM-X-56176
Presented at the Ann. Power Sources Conf. (19th), Atlantic City, May 19, 1965.

Descriptors: *Battery, *NASA Program, *Spacecraft power supply.

PB-169 629 **Field 10C**
CFSTI Prices: HC$7.60
Battelle Memorial Inst., Columbus, Ohio.
THE INVESTIGATION OF NEW ELECTROCHEMICAL SYSTEMS.
Final rept., 1 Mar 53-1 Sep 55,
by A. B. Tripler, Jr., W. T. Buckingham, L. D. McGraw, and C. L. Faust. 1 Sep 55, 142p
Contract DA-36-039-sc-42682,
Projs. 162B, DA-3-99-09-022
AD 78 194

Descriptors: (*Batteries + components, Materials), Electrolytes, Manganese compounds, Phosphates, Plastics, Organic compounds, Iron compounds, Electrodes, Silver compounds, Oxides, Barium compounds, Ferrates, Quinones.

Identifiers: Depolarizers (Electrical).

Topics include: Electrochemical Behavior of Ferrosilicon, Ferroboron and Fe Carbides; Trivalent Manganese, Redox Resins, Ag2O3, and Monomeric organic compounds as electrode d-polarizers; BaFeO4 cathodes; electrodes suitable for use in MnPO4 systems.

AD-633 078 **See Field 11F**

11A. ADHESIVES AND SEALS

AD-284 779 **Field 11A, 7C**
CFSTI Prices: HC$7.60
Borden Chemical Co., Philadelphia, Pa. Central Research Lab.
STUDY LEADING TO THE DEVELOPMENT OF HIGH TEMPERATURE RESISTANT ADHESIVES.
Final rept., 22 Jun 61-22 Jun 62,
by K. C. Tsou, H. E. Hoyt and B. D. Halpern. 22 Jun 62, 79p
Contract DA-36-034-ORD-3501-RD

Descriptors: *Heat-resistant materials, Adhesives), (*Adhesives, Preparation), (*Thermosetting plastics, Adhesives), Epoxy plastics, Phenolic plastics, Phenols, Purification, Polymerization, Chemical analysis, Thermal stability, Stainless steel, Bonding, Effectiveness, Tensile properties, Aging (Materials), Bromine com pounds, Copolymerization, Phenyl ethers.

Identifiers: Bromo phenols, Ladder polymers.

A summary is given of the results of evaluation of poly2,6-dimethyl-1,4-phenylene oxide, poly-2-methyl-6-allyl1,4-phenylene oxide, copolymers of 2,6-dimethyl-4-bromophenol and 2-methyl-6-allyl-4-bromophenol and epoxy derivatives of the allyl-containing polymers, poly-2-methyl6-methallyl-1,4-phenylene oxide, and copolymers of 2-methyl-6-methallyl-4-bromophenol and 2,6-dimethyl-4bromophenol as high temperature adhesive base materials. Phase I of this project involved the synthesis and characterization of these new thermosetting polymers. Phase II involved evaluation of these new thermosetting polyphenylene oxides as high temperature adhesives. Attemped polymerizations of 2-methyl-4-bromophenol were carried out. Synthesis of bismethylene-2,2'-dimethyl-4,4'-dibromophenol and attempted polymerizations to ladder type o-cresolnovolac polymer were made. Several triazine polymers were made. (Author)

AD-633 238 **Field 11A, 11D, 13I**
CFSTI Prices: HC$2.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
SELF-LUBRICATED COMPOSITE MATERIALS FOR HIGH-PRESSURE AIR SEALS (FILAMENT-WOUND STRUCTURES).
Research and development phase rept.,
by Harry Halliwell, and J. R. Ward. May 66, 31p
MEL-56/66
Proj. S-F020-03-05,
Task 0620

Descriptors: (*Composite materials, *Filament wound construction), (*Hermetic seals, Composite materials), Lubrication, High-pressure research, Lubricants, Plastic seals, Glass textiles, Compressor parts, Polyethylene plastics, Leakage (Fluid), Reliability, Wear resistance, Pistons, Gas seals, Life expectancy.

Identifiers: Polytetrafluoroethylene.

In a continuing program to exploit the unusual properties and potential advantages of solid composite lubricants, a sleeve-type seal based on reinforced polytetrafluoroethylene was developed as a piston seal for high-pressure air compressors. The status of the material development for maximizing the effectiveness and life of this seal is reported. Specifically considered is the use of an organized metallic filament-winding technique to provide a superior reinforcing matrix as compared to the randomly dispersed particles and fibers used heretofore. New approaches to combinations of composites for this and other applications have been uncovered. It is possible to expect reliable compressor operation at 5000 psi using such seals in lieu of conventional split rings for periods beyond 1000 hours with very low rates of wear and air leakage. (Author)

BDX-613-56 **Field 11A, 13D**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.

NEW POTENTIAL IN RIGID POTTING COMPOUND,
by R. L. Sadler, and E. F. Jacobs. 1961, 16p
CONF-640505-1
Contract AT (29-1)-613
Presented at the Society of Plastics Engineers, Milwaukee 18 May 1964.

Descriptors: (*Sealing compounds, Epoxy plastics), (*Plastic seals, Packing materials).

AD-633 037 **See Field 13H**

11B. CERAMICS, REFRACTORIES, AND GLASSES

AD-632 788 **Field 11B, 20B, 20C**
CFSTI Prices: HC$5.00 MF$1.00
Linden Labs., Inc., State College, Pa.
CRYSTAL CHEMISTRY OF CERAMIC DIELECTRICS.
Summary rept. no. 2 (Final), 22 Dec 64-21 Jun 65,
by W. R. Buessem and P. A. Marshall, Jr. Apr 66, 156p Rept. no. 24
Contract DA-28-043-AMC-00170 (E),
Proj. DA-1C0-24401-A-112,
Task 1C0-24401-A-112-03
ECOM 00170-F
Continuation of Contract DA-36-039-AMC-00107 (E).

Descriptors: (*Ceramic materials, *Dielectrics), (*Barium compounds, Titanates), (*Titanium compounds, Dioxides), Resistance (Electrical), Degradation, Ceramic capacitors, Humidity, Protons, Space charges, Crystal lattice defects, Voltage, Dielectric properties, Direct current, High-temperature research.

Identifiers: Barium titanate, Titanium dioxide.

Gradual changes in experimental and commercial Ti02 and BaTi03 bodies upon application of DC-stresses at high temperatures were observed and measured during and after the test. The changes in resistivity are sometimes accompanied by changes in capacity, loss factor and color. The current producing these changes has the features of an absorption current: it can be partly recovered; the discharge current can be measured over very long periods of time. Investigation of the effect of the electrode material on all changes occurring reveals that only the electrode material at the anode has an influence on the sign and on the rate of the change. Humidity has a very detrimental effect upon some dielectrics. Treatment in a humid atmosphere at 1000C stores protons in some form in the material; these protons become activated during life test and produce rapid degradation. After removal from the DC life test, the changes produced by the DC stress disappear and the sample might recover completely, if the degradation damage has not been too severe. There are also chemical means to prevent the entering and migration of the two mobile defects. (Author)

AD-633 299 **Field 11B, 21H**
CFSTI Prices: HC$1.00 MF$0.50
Army Materials Research Agency, Watertown, Mass. Materials Engineering Div.
OXIDATION STUDIES OF TITANIUM BORONITRIDE IN AIR.
Technical rept.,
by Albert P. Levitt, and Philip Wong. Apr 66, 17p
AMRA-TR-66-09
Proj. DA-1A024401A11003,
Task 35846

Descriptors: (*Cermets, *Oxidation), (*Titanium compounds, Cermets), Boron compounds, Nitrides, High-temperature research, Heat of activation, Rocket motor nozzles.

Identifiers: Titanium boronnitride.

The oxidation characteristics of titanium boronitride formed by reactive hot pressing were determined over the temperature range 1010 C to 1425 C. An automatic recording balance was used to determine weight loss versus time at each test temperature for compositions containing 1.5 and 2 moles of excess boron nitride. It was found that (a) a parabolic rate law holds for oxidation of this material; (b) there was very little difference between the oxidation rates for the two compositions; and (c) the overall activation energy for the process was 28,000 calories per mole. X-ray diffraction analysis of the oxidized surface layer indicated that it was primarily composed of TiO2. The presence of boron oxide was suggested but not positively identified. Possible oxidation reactions are presented and the mechanisms are discussed. It was concluded that titanium boronitride cannot be used for sustained structural service in an oxidizing atmosphere above 1000 C. (Author)

N66-15358 **Field 11B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Huntsville, Ala.
SELF-SEALING SHIELDS FOR MICROMETEORITE PROTECTION,
by E. D. Funk. 30 Dec 65, 26p NASA-TM-X-53376

Descriptors: *Meteorite collision, *Meteoroid protection, *Propellant tank, *Self-sealing, *Shielding.

TID-4005 (Pt. 1, 9th ed.) **Field 11B, 11F, 20L**
CFSTI Prices: HC$5.00 MF$2.25
Division of Research (AEC), Washington, D. C.
SUMMARIES OF THE USAEC BASIC RESEARCH PROGRAMS IN METALLURGY, SOLID-STATE PHYSICS AND CERAMICS (FISCAL YEAR 1965).
Jan 66, 485p

Descriptors: (*Reactor materials, Scientific research), (*Solid state physics, Reactor materials).

AD-271 185 **See Field 11G**

AD-632 762 **See Field 5A**

AD-632 890 **See Field 13H**

AD-633 086 **See Field 13J**

ANL-7070 **See Field 18J**

PB-170 128 **See Field 5C**

USBM-RC-1220 **See Field 18J**

11C. COATINGS, COLORANTS, AND FINISHES

AD-459 468 **Field 11C, 22B**
CFSTI Price: HC$5.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
STUDY OF SURFACES DESIGNED TO INCREASE THERMAL RADIATION,
by Robert G. Hires and Richard C. Evans. Nov 64, 60p TG-618
Contract NOw-62-0604-c

Descriptors: (*Satellites (Artificial), Thermal radiation), (*Heat transfer, Paints), Coatings, Emissivity, Titanium compounds, Dioxides.

This paper is a report on some of the work done during the past year on the experimental evaluation of the relative thermally emissive properties of certain radiative coatings applied to a series of systematically altered surfaces. These surfaces were made up of multiple V-grooves cut in aluminum, the included angle of which was varied from 22-1/2 to 90 degrees. It is shown that a 20 percent gain in power dissipation for a given temperature was obtained from the use of a multiple-grooved surface radiator coated with white PV-100 over that of an equivalently painted flat surface, and that a 100 percent gain in power dissipation resulted from using a grooved sandblasted surface instead of a flat sandblasted surface. A preferred groove angle is indicated, based on the data presented. The method used in this work is, in essence, the classical experiment for the determination of the Stefan-Boltzmann constant but differing in the use of samples having emissivities less than unity.

BDX-613-6 **Field 11C, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.
ADVANTAGES OF GLASS MICROBALLOONS AS FILLER MATERIAL.
by F. R. Walterbach. 10 Aug 60, 18p
Contract AT (29-1)-613

Descriptors: (*Epoxy plastics, Additives), (*Glass, Particle size).

N66-18340 **Field 11C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SHEAR BOND STRENGTH OF ALUMINA COATINGS,
by S. J. Grisaffe. 1965, 10p NASA-TM-X-56280
Presented at the Meeting of the Refractory Composites Working Group (10th), Atlanta, Apr 12-14, 1965.

Descriptors: *Particle size, *Surface roughness, *Aluminum oxide, *Coating, *Shear strength.

AD-632 672 **See Field 11F**

AD-633 038 **See Field 13H**

11D. COMPOSITE MATERIALS

AD-633 213 **Field 11D, 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
EVALUATION OF THE STRUCTURE AND STRENGTH OF GLASS-DRAWN COPPER MICROWIRE.
30 Mar 66, 12p NAEC-AML-2424
Task RRMA-03-004/200-1/R007-05-01

Descriptors: (*Copper, Fiber metallurgy), (*Composite materials, *Drawing (Machine processing)), (*Wire, Composite materials), Copper, Glass, Tensile properties, Microstructure, Encapsulation, X-ray diffraction analysis.

A size dependence was found in the strength of glass drawn copper microwires, and the finest wires, near 1 micron in diameter, showed the highest strength. Allowing for systematic errors in the measurement of the areas of cross sections of tension specimens, there is sufficient evidence indicating that the finest wires are capable of strengths above 200 ksi. Although most of the copper microwires in the larger size range, 6- 16 microns, showed strengths near 100 ksi, a few showed strengths near 40 ksi. This is contrasted with the near 30 ksi strength found in annealed, polycrystalline bulk copper; hence, strength then could be related to degree of crystalline perfection. The x-ray diffraction data on a bundle of parallel

larger size copper microwires indicates strongly the presence of preferred orientation, and therefore, a preferred growth direction. In view of the process used in producing the glass-drawn microwires and their unusually high strength capability, it is concluded that the wires can be grown in the form of almost continuous single crystals with few dislocations present. (Author)

AD-633 236 **Field 11D, 14E, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
AN AUTORADIOGRAPHIC TECHNIQUE FOR STUDYING CRACK GROWTH IN PLASTICS COMPOSITE MATERIALS,
by Marlin A. Kinna. 1 Apr 66, 26p NOLTR-66-2
Task RREN-ST-204/212-5/0000

Descriptors: (*Composite materials, *Fracture (Mechanics)), (*Autoradiography, Fracture (Mechanics), Plastics, Reinforcing materials, Filament wound construction, Radioactive isotopes, Non-destructive testing, Glass textiles.

Preliminary work has been conducted on segments of NOL Rings to study crack propagation characteristics in fiber reinforced plastics composite materials. Samples were submitted to a variety of fatigue loading conditions. They were then immersed in a tritiated water-ethylene glycol solution and after suitable processing, autoradiograms were prepared for analysis. Radiation emanating from the solution retained by the samples indicated that minute cracks and fissures were present in all of the specimens and that the radiation intensity varied in direct proportion to the severity of the fatigue loading conditions. When photomicroscopy was used to analyze similar specimens, cracks could be detected only for the most severe test conditions. (Author)

AD-633 245 **Field 11D, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
GLASS TEXTOLITE,
by I. Ya. Klinov, and A. N. Levin. 1966, 10p Trans-1050
TT 66-61281
Steklotekstolity, trans. of mono. Plastmassy v Khimicheskom Mashinostroenii, Moscow, 1963 p51-60.

Descriptors: (*Composite materials, *Glass textiles), USSR, Plastics, Impregnation, Tensite properties, Reinforcing materials.

Glass textolite is a glass fabric material which is impregnated with furil, epoxy, polyester, silicone-organic or other resins. The polymers in the fabric act as the bonding and chemically stable components, while the glass fabric acts as a reinforcing element which takes the basic load under operational conditions. Glass filler. As a result of the glass thread-like base, the glass textolite has improved heat-flash, and water-resistance, chemical stability, hydrophobic nature, and a low modulus of elasticity. It does not creep even as a result of prolonged loads. The qualities of glass textolite may vary widely, depending on the thickness of the glass fiber, the structure of the glass thread, the previous processing of the glass filler, the type of bonding agents, and the method of producing the laminated plastic. According to their chemical composition, glass fibers are divided into the following categories: nonalkali, alkali, silver, copper, boron, lead, phosphorous, etc. A glass fiber which is obtained from nonalkaline or low-alkaline aluminium boro-silicate glass possesses greater strength (almost 20% more), lower hygroscopicit, greater chemical stability and improved dielectric properties in comparison with an alkaline glass fiber. In the production of glass plastics, a thin textile glass fiber of 3-12 micron diameter is used most frequently.

N66-18155 **Field 11D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
STUDY OF THE GROWTH PARAMETERS INVOLVED IN SYNTHESIZING BORON CARBIDE FILAMENTS,
by E. Feingold, A. Gatti, J. Kitler, and C. Mancuso.Sep 65, 37p R65SD51
Contract NASw-1205
NASA CR-70518

Descriptors: *Boron carbide, *Composite material, *Whisker, *Deposition.

AD-271 185 **See Field 11G**

AD-633 238 **See Field 11A**

11E. FIBERS AND TEXTILES

PB-169 462 **Field 11E**
CFSTI Prices: HC$4.00 MF$1.00
Little (Arthur D.) Inc., Cambridge, Mass.
STATE OF THE ART INVESTIGATION ON AUTOMATED HANDLING OF LIMP FABRICS, PHASE I.
Aug 65, 132p
Contract C-67184
Report to the Apparel Research Foundation, Inc.

Descriptors: (*Textiles, Handling), Bending, Automation, State-of-the-art reviews, Mechanical properties, Patents, Clothing, Separation, Abstracts, Feasibility studies.

A research program was undertaken to attest and demonstrate the feasibility of automatic and fully mechanized handling of limp woven and nonwoven fabrics of precut, irregular shapes from aligned stacks to the exact positioning for multi-ply fastening operations prior to fastening time.

AD-633 086 **See Field 13J**

PB-170 014 **See Field 5C**

11F. METALLURGY AND METALLOGRAPHY

AD-632 672 **Field 11F, 11C**
CFSTI Prices: HC$1.60 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
ALUMINUM CASTINGS FOR ANODIC OXIDATION,
by A. A. Bloch. 1966, 17p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1C024401A-328
AERDL T-1835-66, TT 66-61239
Trans. of Giesserei (West Germany) v48 p145-50 1961. Presented at the International Foundry Congress (27th), Zurich, 19-24 September 1960.

Descriptors: (*Aluminum alloys, Casting), (*Anodes (Electrolytic cell), Oxidation), (*Metal coatings, Aluminum alloys), Casting alloys, Magnesium alloys, Silicon alloys, Cavitation, Oxides, Grain structure (Metallurgy), Etching, Corrosion, West Germany.

The significance of the manufacture of decorative anodically oxidized aluminum castings is demonstrated by means of examples, and alloys suitable for this are enumerated. Then dealt with are errors of casting and melting technique which become apparent with surface treatment. A few principles concerning ingate technique are especially discussed. (Author)

AD-632 926 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Pitman-Dunn Research Labs., Frankford Arsenal, Philadelphia, Pa.
FRACTURE TOUGHNESS EVALUATION OF TITANIUM, ALUMINUM, AND STEEL.
Memorandum rept.,
by John W. Forney. Mar 66, 16p
Proj. NASA MIPR-C-35060A
FA M66-20-1

Descriptors: (*Titanium alloys, *Fracture (Mechanics)), (*Aluminum alloys, *Fracture (Mechanics)), (*Steel, *Fracture*Mechanics)), Toughness, Heat treatment, Transition temperature, Strain (Mechanics), Hardness, Martensite.

Identifiers: Fracture toughness, Aluminum alloy 2014, Titanium alloy 6Al-4V, Steel 4340.

The plane strain fracture toughness of 2014-T6 aluminum alloy, 6Al-4V titanium alloy, and 4340 steel has been investigated at room temperature and at -75F, using the single edge notched specimen. Data for the 2014-T6 aluminum alloy, 6Al-4V titanium alloy, and 4340 steel, quenched and tempered to Rockwell C 50 hardness, showed the plane strain fracture toughness to be insensitive to testing temperature. The specimens of 4340 steel, quenched and tempered to Rockwell C 30 hardness, were too small for accurate plane strain fracture toughness values, but the results indicate that no transition occurred over the range of testing temperature investigated. The cycle-annealed specimens of 4340 steel indicated a sensitivity of plane strain fracture toughness to testing temperature. These data show the superiority of the quenched and tempered structure to mixed structure, even though both are at the same hardness level. (Author)

AD-632 988 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pitman-Dunn Research Labs., Frankford Arsenal, Philadelphia, Pa.
THE INFLUENCE OF ENVIRONMENT ON THE CRACK PROPAGATION CHARACTERISTICS OF HIGH STRENGTH ALUMINUM ALLOYS.
Technical research rept.,
by Joseph H. Mulherin. Apr 66, 27p
Proj. DA-1C024401A328
FA R-1809

Descriptors: (*Aluminum alloys, *Fracture (Mechanics)), Liquid immersion tests, Stress corrosion, Stresses, Propagation, Environmental tests.

Identifiers: Aluminum alloy 7178, Aluminum alloy 2014, Aluminum alloy 2024, Aluminum alloy 7075.

The stress-corrosion behavior of four alloys of aluminum was investigated. Using cantilever-loaded fatigue-cracked specimens, the crack propagation characteristics of 7178-T6, 2014-T6, 2024-T351, and 7075-T6 aluminum alloys were determined. The aqueous environments used were: immersion in distilled water, constant immersion in 3-1/2 percent sodium chloride, and alternate immersion in salt solution and air. The results are interpreted in terms of fracture mechanics parameters. Where susceptibility to stress-corrosion exists, the rate of crack propagation is dependent upon stress intensity and environment. A method is also presented to obtain threshold values of stress intensity for stress-corrosion attack with minimal experimental effort. Results are compared to those of other testing methods. (Author)

AD-633 050 **Field 11F, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.

ON THE RELATIONSHIP BETWEEN PAIR POTENTIALS AND DISTRIBUTION FUNCTIONS.
Technical rept.,
by S. L. Strong, and Roy Kaplow. 6 Apr 66, 14p
DSR-7954, TR-7
Contract Nonr-1841 (48)

Descriptors: (*Liquid metals, *Potential theory), (*Atomic properties, Liquid metals), Distribution functions, Mercury, Tin.

It is demonstrated that the relationship between pair potentials and distribution functions is experimentally ambiguous for dense fluids. Calculations in the Percus-Yevic approximation show that qualitatively different potentials can be chosen which predict pair distributions which are virtually indistinguishable, and vice-versa. In addition, if the nearest neighbor interaction is predominant, it appears that the assumption of symmetric interactions may not be valid in liquids such as mercury and tin. (Author)

AD-633 052 **Field 11F, 20L**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.
PAIR CORRELATIONS IN LIQUID AND SOLID ALUMINUM.
Technical rept.,
by R. R. Fessler, Roy Kaplow, and B. L. Averbach.29 Apr 66, 37p TR-9, DSR-7954
Contract Nonr-1841 (48)

Descriptors: (*Aluminum, X-ray diffraction analysis), Special functions, Liquid metals, Density, Crystal substructure, Statistical distributions, Models (Simulations).

Radial density functions were determined by x-ray diffraction for solid aluminum at 25, 325, and 655C and for liquid aluminum at 665 and 750C. The first ten coupling factors, averaged for the three temperatures, were 0.70, 0.73, 0.92, 0.90, 0.82, 0.83, 1.00, 0.96, 0.93, 0.93. The radial density functions of liquid aluminum at 665 and 750C were quite similar. Liquid aluminum has the same basic structure as liquid lead, but a different structure than liquid mercury. Comparisons with the random packing model showed that this model does not reproduce the details of the measured radial density function. A quasi-crystalline model, in which the radial density function of the solid is broadened and damped by the introduction of a cell size and liquid diffusive motions, agreed quite well with the experimental density function. A tunnel model, in which atoms move freely in tunnels arranged in a two-dimensional close-packed network also fitted quite well, but a large number of free parameters is required. (Author)

AD-633 078 **Field 11F, 10C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
INVESTIGATION OF THE INTERGRANULAR CORROSION OF LEAD-ANTIMONY GRID ALLOYS.
Interim rept.,
by A. C. Simon. 7 Apr 66, 28p NRL-6387
Projs. SF-013-06-06, RR-001-01-43-4755,
Task 4366

Descriptors: (*Batteries and components, *Corrosion), (*Lead alloys, *Corrosion), Antimony alloys, Stress corrosion, Grain boundaries, Storage batteries, Microstructure, Failure (Mechanics), Porosity.

Microscopic examination of grid sections that had been in service for periods up to 10 years indicated that the ultimate cause of grid failure was an intergranular type of stress corrosion. While the overall corrosion resistance indicated the possibility of many additional years of service, this intergranular corrosion at isolated points had in many cases completely severed the grid member. It appeared that this corrosion was caused by a combination of stress developed in the corrosion product and microporosity in the casting. Two distinct corrosion mechanisms were observed. One type depended upon fairly acidic conditions, and the corrosion product was a hard film of lead dioxide which appeared to offer some protection to the underlying metal. The other type was generated where acid concentrations were low and was much more destructive. The corrosion product formed in this case varied from black to white and did not protect the underlying metal. (Author)

AD-633 214 **Field 11F, 13D, 15E**
CFSTI Prices: HC$1.00 MF$0.50
Clothing and Organic Materials Div., Army Natick Labs., Mass.
INTERIOR CORROSION OF STEEL FIVE-GALLON MILITARY WATER CANS.
Technical rept., Jul 65-Feb 66,
by Joseph P. Urbanek. May 66, 24p MR/E-66-1
USA-NLABS TR-66-40-CM

Descriptors: (*Steel, Corrosion), (*Water tanks, *Corrosion), Military requirements, Quality control.

A study was made of the occurrence of interior corrosion in the steel five-gallon military water can. The study covered used as well as new cans. It was found that much of the rusting is attributable to excessively sharp edges at lap seams, creating a condition that coatings generally cannot be expected to overcome. Other rusting was found to be of limited extent and to vary in location from can to can. The exact cause of this variable corrosion was not proven, but the condition is characteristic of that commonly resulting from locally inadequate surface preparation. It is concluded that the specification should be revised to include (a) smoothing of seam edges, (b) more frequent testing, and (c) simplification of some of the tests so that they will be more amenable to frequent application. (Author)

AD-633 220 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
LOW TEMPERATURE DEFORMATION OF THE TiNi INTERMETALLIC COMPOUND,
by A. G. Rozner, and W. J. Buehler. 1 Mar 66, 19p
NOLTR-66-38
Task RRMA-23-041/F020-01-01

Descriptors: (*Titanium alloys, *Nickel alloys), (*Deformation, Titanium alloys), Intermetallic compounds, Cold working, Stresses, Strain (Mechanics), Tensile properties, Ductility, Martensite.

Identifiers: Nitinols (Alloys).

The effect of cold working on room temperature mechanical properties of TiNi intermetallic compound was investigated. Samples were cold worked at temperatures well below their martensitic transformation temperature, by means of conventional metal working techniques. The low temperature ductility is ascribed to a martensitic transformation and enables deforming the TiNi compound at low temperatures where the work hardening rate is very high. The martensitic transformation in TiNi is promoted by application of external forces and the TiNi-martensite exhibits high strength and ductility at room temperature. The low temperature deformation increases the room temperature yield strength of stoichiometric TiNi from 18,000 to 61,000 psi and the ultimate tensile strength from 125,000 to 220,000 psi while preserving an elongation of 15 percent. (Author)

AD-633 300 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Yale Univ., New Haven, Conn. Kline Geology Lab.
THE YIELDING OF STEEL STUDIED BY ULTRASONICS.
Technical rept.,
by D. A. Koss, and R. B. Gordon. Oct 65, 39p
TR-9
Contract Nonr-609 (35)

Descriptors: (*Steel, Tensile properties), (*Ultrasonic radiation, Steel), Attenuation, Strain (Mechanics), Crystal lattice defects, Aging (Materials), Stresses, Heat of activation.

Changes in the ultrasonic attenuation in steel specimens have been observed during tensile tests. Samples of AISI 1020, 1045, and 1095 steel quenched and tempered to a spheroidized condition have been used. Both attenuation and microstrain measurements fail to reveal pre-yield dislocation motion in the as-tempered specimens. Upon reapplication of the load to samples in the strain-aged condition there is a large pre-yield attenuation increase but no observable microstrain up to 90% of the flow stress. These and other observed changes can be related to changes in the free dislocation density and the mean dislocation segment length. The results show that the increase in flow stress in the strain-aged condition is caused by increased frictional stresses rather than by dislocation pinning. Strain aging is found to proceed through three distinct stages. The second of these follows the t to the 2/3 power law and is characterized by an activation energy of 20 kcal/mole. (Author)

AD-633 402 **Field 11F, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania Univ., Philadelphia. Electro-Chemistry Lab.
HYDROGEN EMBRITTLEMENT RESULTING FROM CORROSION, CATHODIC PROTECTION AND ELECTROPLATING.
Quarterly rept. no. 3 for 2 Dec 65,
by John O'M Bockris, E. Gileadi, and M. Fullenwider.7 Mar 66, 14p
Contract N156-46659
See also AD-446 525.

Descriptors: (*Hydrogen embrittlement, *Test equipment), (*Corrosion, Hydrogen embrittlement), (*Electroplating, Hydrogen embrittlement), (*Cathodic protection, Hydrogen embrittlement), Non-destructive testing, Numerical analysis, Steel, Reliability.

The concentrations of hydrogen determined by the method of charging-up followed by pulling-out of hydrogen with the Barnacle Electrode were found to vary between 0.000002 and 0.000006 moles/cu cm, depending upon the conditions of polarization. These concentrations were calculated with an approximation, good for small times, the mathematics of which is outlined briefly.

ANL-7102 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
GROWTH AND ANNEALING OF EVAPORATED ALUMINUM-SILICON FILMS,
by R. K. Hart and D. G. Pilney. Nov 65, 13p
Contract W-31-109-eng-38

Descriptors: (*Metal films, Annealing), (*Aluminum alloys, Silicon alloys).

BMI-1755 **Field 11F, 18J**
CFSTI Prices: HC$0.50 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PHASE EQUILIBRIA IN THE URANIUM-TUNGSTEN -OXYGEN SYSTEM,

by Roy A. Smith, Donald E. Kizer, Edward O. Speidel, and Donald E. Keller. 17 Jan 66, 22p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Eutectics), (*Phase studies, Metallurgy).

CEND-508 **Field 11F, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Combustion Engineering, Inc., Dunedin, Fla. Nuclear Div.
INVESTIGATION OF CATALYTIC RECOMBINATION OF RADIOLYTIC OXYGEN AND HYDROGEN.
Quarterly rept., Jul-Sep 64,
by Gilbert M. Brown, and Thomas C. Sawyer. 1964, 37p EURAEC-1233
Contract AT (40-1)-3151

Descriptors: (*Steam, Catalysts), (*Stainless steel, Stress corrosion).

CONF-650210-2 **Field 11F, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
KOSSEL DIFFRACTION PATTERNS OF A URANIUM SINGLE CRYSTAL,
by E. F. Sturcken. 18 Feb 65, 9p
Contract AT (07-2)-1
Prepared for presentation at X-Ray Diffraction in the Atomic Energy Field Meeting, Richland, Wash.

Descriptors: (*X-ray diffraction analysis, Uranium), (*Uranium, Single crystals).

COO-1319-12 **Field 11F, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus.
A STUDY OF THE MECHANISM OF STRESS CORROSION CRACKING IN THE IRON-NICKEL-CHROMIUM ALLOY SYSTEM.
Quarterly rept. 17 Dec 63-16 May 64,
by F. H. Beck, M. G. Fontana, and J. P. Hirth. 31 Mar 64, 37p
Contract AT (11-1)-1319

Descriptors: (*Alloys, Stress corrosion), (*Corrosion, Electrochemistry).

COO-1319-15 **Field 11F, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus.
A STUDY OF THE MECHANISM OF STRESS CORROSION CRACKING IN THE IRON-NICE-CHROMIUM ALLOY SYSTEM.
Quarterly rept. 17 Mar -16 Jun 64,
by F. H. Beck, M. G. Fontana, and J. P. Hirth. 17 Jun 64, 56p 000-1319-15
Contract AT (11-1)-1319
Proj. RF-1673

Descriptors: (*Alloys, Stress corrosion), (*Corrosion, Electrochemistry).

COO-578-P27-4 **Field 11F, 20K**
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill.
YIELD PHENOMENA AND FRACTURE OF HYDRIDED ZIRCONIUM.
Quarterly rept. 1 Oct-31 Dec 64,
by D. Weinstein. 1 Feb 65, 32p EURAEC-1336, IITRI-B6035-4
Contract AT (11-1)-578

Descriptors: (*Yield point, Zirconium alloys), (*Zirconium alloys, Crystal structure).

N65-20790 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Union Carbide Corp., Parma, Ohio. Carbon Products Div.
HIGH TEMPERATURE PROTECTIVE COATINGS FOR REFRACTORY METALS.
Progress rept. no. 1,
by E. B. Bitzer, J. Rexer, and R. G. Fenish. 1965, 29p
Grant NASw1030
NASA CR-57768

Descriptors: (*Refractory metals, Coatings).

N66-10420 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SLIP IN TUNGSTEN AT HIGH TEMPERATURES,
by J. L. Taylor. 15 Oct 65, 16p JPL-TR-32-818
Contract NAS7-100
NASA CR-67699

Descriptors: *Slip, *Tungsten, *Deformation, *Single crystal.

N66-10428 **Field 11F**
CFSTI Prices: HC$4.00 MF$1.00
TRW Inc., Cleveland, Ohio. TRW Equipment Labs.
THE CORROSION OF SUPERALLOYS BY LITHIUM FLUORIDE IN A CYCLIC HIGH TEMPERATURE ENVIRONMENT.
Engineering rept., Jul 63 - Jul 65,
by R. C. Schulze. 21 Jun 65, 149p TRW-ER-6561
Contract NAS3-2779
NASA CR-54781

Descriptors: *Brayton cycle, *Superalloy, *Corrosion resistance, *Lithium fluoride.

N66-11631 **Field 11F**
CFSTI Prices: HC$7.00 MF$1.75
Advisory Group for Aerospace Research and Development, Paris (France).
HANDBOOK ON THE PROPERTIES ON NIOBIUM, MOLYBDENUM, TANTALUM, TUNGSTEN AND SOME OF THEIR ALLOYS,
by R. Syre. May 65, 319p AGARDOGRAPH-94

Descriptors: *Handbook, *Molybdenum, *Tungsten, *Niobium, *Tantalum.

N66-15355 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.
ADVANCED AIR BREATHING ENGINE TECHNOLOGY. MATERIALS. A REVIEW OF CONTRACTS,
by S. J. Grisaffe. 1966, 15p NASA-TM-X-52170
Presented at Refractory Composites working group Meeting (11th), Los Angeles, Jan 24-28 1966.

Descriptors: *Engine part, *High temperature material, *Jet engine, *Air breathing engine.

N66-15789 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Aerojet-General Corp., Sacramento, Calif.
DIMENSIONAL INSTABILITY OF ALUMINUM ALLOYS FOR EXTREME LOW TEMPERATURE CYCLING APPLICATIONS (GGV MATERIAL INSTABILITY PROBLEM),
by F. M. Henson, and F. Inouye. 31 Jan 66, 42p AGC-8800-12,
Contract NAS3-2555
NASA CR-54829

Descriptors: *Aluminum alloy, *Dimensional stability, *Instability, *Thermal cycling, *Cryogenic temperature.

N66-16739 **Field 11F**
CFSTI Prices: HC$4.00 MF$0.75
Hughes Aircraft Co., Culver City, Calif. Aerospace Group.
STUDY OF ADHESION AND COHESION IN VACUUM.
Final rept.,
by D. V. McIntyre, and P. M. Winslow. 20 Aug 65, 120p P65-94
Contract NAS8-11066
NASA CR-70046

Descriptors: *Adhesion, *Spacecraft structure, *Metal-metal bonding, *Structural material, *Vacuum effect.

N66-17322 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pitman-Dunn Research Labs., Frankford Arsenal, Philadelphia, Pa.
ENERGY ABSORPTION PROPERTIES OF CELLULAR ALUMINUM,
by S. Lipson. Nov 65, 41p R-1784
Contract NASA Order-L-18381
NASA CR-70396

Descriptors: *Casting, *Compression testing, *Aluminum alloy, *Energy dissipation, *Kinetic energy, *Metallurgy.

N66-17579 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SELF-LUBRICATING COMPOSITES OF POROUS NICKEL AND NICKEL-CHROMIUM ALLOY IMPREGNATED WITH BARIUM FLUORIDE - CALCIUM FLUORIDE EUTECTIC,
by H. E. Sliney. 1966, 35p NASA-TM-X-52185
To be presented at the Ann. Meeting of the Am. Soc. of Lubrication Engr., Pittsburgh, May 2-5, 1966.

Descriptors: *Self-lubricating material, *Barium fluoride, *Calcium fluoride, *Chromium alloy, *Nickel.

N66-18156 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Avco Corp., Tulsa, Okla.
A STUDY OF THE BLISTERING OF METAL SURFACES BY SOLAR SYSTEM IONS.
Interim rept.,
by J. A. Cooley. 1 Dec 65, 31p TR-65-363-2
Contract NASw-1203
NASA CR-70519

Descriptors: *Aluminum, *Proton irradiation, *Hydrogen, *Metal surface, *Surface reaction.

N66-18328 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
APPLICATION OF ULTRASONICS TO DETECTION OF FATIGUE CRACKS,
by J. C. Freche, S. J. Klima, and D. J. Lesco. 1965, 31p NASA-TM-X-52109
Presented at the Intern. Congr. on Exptl. Mech. (2nd), Washington, D. C., Sep 28-30, 1965.

Descriptors: *Aluminum alloy, *Crack, *Nickel alloy, *Metal fatigue, *Ultrasonics.

N66-18329 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.

EFFECT OF SILICON AND IRON CONTENT ON EMBRITTLEMENT OF A COBALT-BASE ALLOY (L-605),
by R. L. Ashbrook, J. C. Freche, and G. D. Sandrock. 14 May 65, 13p NASA-TM-X-56554

Descriptors: *Cobalt alloy, *Embrittlement, *Iron, *Silicon.

N66-18333 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EFFECTS OF VACUUM ON THE TENSILE PROPERTIES OF MAGNESIUM SINGLE CRYSTALS,
by H. G. Nelson and D. P. Williams. 1965, 25p NASA-TM-X-56156
Presented at the SME portion of the 1965 AIME Ann. Meeting, Chicago, Feb 14-18, 1965.

Descriptors: *Magnesium, *Single crystal, *Tensile strength, *Vacuum effect.

N66-18356 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
PRELIMINARY RESULTS OF A STUDY OF COATED TA-10 W SHEET FOR HEAT-SHIELD APPLICATIONS,
by B. A. Stein and G. R. Wichorek. 1965, 18p NASA-TM-X-56312
Presented at the Meeting of the Refractory Composites Working Group (10th), Atlanta, Apr 12-14, 1965.

Descriptors: *Heat shield, *Tungsten alloy *Oxidation, *Tantalum alloy.

N66-18359 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A REVIEW OF FATIGUE RESEARCH IN THE UNITED STATES,
by H. F. Hardrath. 1965, 25p NASA-TM-X-56562
Presented at the Intern. Comm. on Aeron. Fatigue, Munich, Jun 21-22, 1965.

Descriptors: *Acoustic fatigue, *Fatigue test, *Plastic deformation, *Structural fatigue, *Supersonic transport.

N66-18360 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF VARIATIONS IN SILICON AND IRON CONTENT ON EMBRITTLEMENT OF L-605 (HS-25),
by R. L. Ashbrook, G. D. Sandrock, and J. C. Freche. 1965, 33p NASA-TM-X-52099
Prepared for presentation at The Natl. Metal Exposition and Congr., Detroit, Oct 18-22 1965.

Descriptors: *Ductility, *Iron, *Silicon, *Cobalt alloy, *Embrittlement, *Tensile strength.

N66-18370 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FRICTION AND WEAR OF HEXAGONAL METALS AND ALLOYS AS RELATED TO STRUCTURE AND LATTICE PARAMETERS IN VACUUM TO 10-10 MILLIMETER OF MERCURY,
by D. H. Buckley and R. L. Johnson. 1965, 39p NASA-TM-X-52096
Presented at the Lubrication Conf., San Francisco, Oct 11-13, 1965.

Descriptors: *Alloy, *Crystal lattice, *Metal, *Sliding friction, *Structure, *Wear.

N66-18380 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
THE VANADIUM-GALLIUM SYSTEM IN THE REGION OF V3 GA,
by J. J. Fischer and H. B. Probst. 15 Apr 65, 17p NASA-TM-X-56545

Descriptors: *Metallography, *Gallium compound, *Vanadium compound, *X-ray diffraction.

N66-18382 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INVESTIGATION OF PHYSICAL PROPERTIES AFFECTING THERMAL SHOCK RESISTANCE OF ZIRCONIA WITH 15 MOLE PERCENT TITANIUM,
by A. Arias. 25 Feb 65, 33p NASA-TM-X-56320

Descriptors: *Physical property, *Thermal shock, *Zirconium oxide.

N66-18383 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INVESTIGATION OF THE MECHANISM BY WHICH METAL ADDITIONS IMPROVE THE THERMAL SHOCK RESISTANCE OF ZIRCONIA,
by A. Arias. 26 Feb 65, 36p NASA-TM-X-56318

Descriptors: *Shock load, *Thermal shock, *Zirconium oxide, *Metal reinforcement.

OTR-137 **Field 11F**
National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
BERYLLIUM--ITS CHARACTERISTICS AND APPLICATIONS.
1966, 32p
Westinghouse Electric Corp., Baltimore, Md.

Descriptors: (*Beryllium, State-of-the-art reviews), Heat-resistant metals ; alloys, Nuclear reactors, Powder metallurgy, Physical properties, Mechanical properties, Processing.

Significant reports covering the period since 1959 were selected for this study, with reference to relevant earlier works. The search extended through Government reports issued in Feb. 1965, trade journals issued as late as May 1965, and the Defense Metals Information Center's 'Review of Recent Developments' published Aug. 1965. The metal beryllium has many attributes which make it attractive to industrial designers of nuclear reactors and high performance aircraft. Its density is similar to that of magnesium, its strength when cold worked is 200,000 psi, and its fatigue properties are excellent. Its strength-to-weight ratio is approximately twice that of aluminum and three times that of stainless steel. It also has a modulus of elasticity 1 1/3 times that of steel and excellent thermal properties. However, there are certain difficulties encountered in the fabrication of beryllium which limit its use. These limitations revolve about its limited room-temperature ductility, poor weldability, low impact strength, toxicity, and high cost. Numerous programs are underway to find the solutions to these problem areas. (Author)

RL-SEP-503-1 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.

BATCH ELECTROREFINING OF PLUTONIUM METAL.
Progress rept.,
by T. S. Soine. May 65, 32p
Contract AT (45-1)-1350

Descriptors: (*Plutonium, Refining (Metallurgy)), (*Metals, Purification).

TID-20343 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Technological Inst.
LATTICE PARAMETER MEASUREMENTS OF UNDOPED AND CHROMIUM-DOPED WUSTITE,
by Roger L. Levin, and J. Bruce Wagner Jr. 1964, 14p
Contract AT (11-1)-1126

Descriptors: (*Iron alloys, Crystal lattices), (*Chromium alloys, Doping).

Identifiers: Wustite.

TID-21663 **Field 11F, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Miami Univ., Coral Gables, Fla. Dept. of Mechanical Engineering.
PREPARATION AND EVALUATION OF DISPERSION -STRENGTHENED IRON-ALUMINUM-CHROMIUM ALLOYS.
Annual summary rept.,
by Blake King, and H. A. B. Wiseman. 29 Oct 64, 69p
Contract AT (40-1)-3153

Descriptors: (*Alloys, Dispersion hardening), (*Powder metallurgy, Extrusion).

Y-1490 **Field 11F, 14B, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
PENETRATION TESTS,
by W. T. Carey. 4 Mar 66, 17p
Contract W-7405-eng-26

Descriptors: (*Aluminum, Penetration), (*Steel, Penetration).

AD-632 713 See Field 11H

AD-632 762 See Field 5A

AD-632 998 See Field 20L

AD-633 005 See Field 20B

AD-633 018 See Field 20B

AD-633 037 See Field 13H

AD-633 038 See Field 13H

AD-633 039 See Field 13H

AD-633 040 See Field 13H

AD-633 051 See Field 20B

AD-633 194 See Field 6E

AD-633 213 See Field 11D

AD-633 247 See Field 13H

AD-633 388 See Field 20L

ANL-6969 See Field 18J

ANL-7070 See Field 18J

ANL-7079 See Field 18J

BNL-972 See Field 18J

CONF-170 See Field 18J

NLCO-968 See Field 18J

PB-169 475 See Field 20D

PB-170 054 See Field 5C

PB-170 125 See Field 5C

PB-170 146 See Field 5C

PB-170 147 See Field 5C

PB-170 148 See Field 5C

PB-170 149 See Field 5C

PB-170 170 See Field 5C

PB-170 179 See Field 5C

PB-170 184 See Field 5C

RFP-668 See Field 18D

RL-REA-2595 See Field 20B

RMI-3 See Field 18J

SC-DR-65-530 See Field 18J

SC-R-65-997 See Field 18J

TID-19978 See Field 7D

TID-4005 (Pt. 1, 9th ed.) See Field 11B

USBM-RC-1220 See Field 18J

11G. MISCELLANEOUS MATERIALS

AD-271 185 Field 11G, 11B, 11D
CFSTI Prices: HC$42.60
Materials Advisory Board, NAS-NRC, Washington, D.C.
SYMPOSIUM ON DESIGN WITH MATERIALS THAT EXHIBIT BRITTLE BEHAVIOR, VOLUME I, DECEMBER 13-14, 1960,
20 Oct 61, 430p MAB-175-M
Contract DA-36-039-sc-76436

Descriptors: (*Ceramic materials, Brittleness), (*Composite materials, Brittleness), (*Brittleness, Symposia), Mechanical properties, Reentry vehicles, Leading edge, Heat shields, Porous materials, Nose cones, Aircraft engines, Gas turbines, Compressor parts, Plastics, Glass textiles, Thermoelectricity, Thermal stresses, Design.

Contents: Some engineering aspects of the strength of ceramic materials; Dislocation theory applied to the structural design problem in ceramics; The role of blending creep data in design with brittle materials; A method of analyzing bend test data obtained from a strain-rate-sensitive material; Analysis of brittle fracture in sheet materials; Structural significance of ductility; A comparison of brittle behavior of metallic and nonmetallic materials; Review of brittle fracture criteria in ceramic materials; Ceramic-metallic structural design for hyperthermantic vehicles; Design considerations and structural usage of brittle materials; Leading edge design with brittle materials; Foamed ceramics in heat shield design; Application of brittle materials in glide re-entry nose cone design; Brittle materials design problems in aircraft gas turbines; Glass-reinforced plastic as an aviation gas turbine compressor housing material; Thermoelectric generator design; Design of a brittle material; Ceramic design for thermal shock; Critical behavior of ceramic composite. (Author)

AD-632 686 Field 11G, 19A
CFSTI Prices: HC$3.00 MF$0.75
Naval Ammunition Depot, Crane, Ind.
AIR REACTIVE COMPOUNDS: LISTING AND PROPERTIES,
by Bernard E. Douda. 24 Feb 66, 61p RDTR-71

Descriptors: (*Pyrophoric materials, Physical properties), Air, Chemical reactions, Solubility, Refractive index, Melting point, Boiling point, Vapor pressure, Viscosity, Thermal properties, Flammability, Autoignition, Surface tension, Dipole moments.

Identifiers: Air-reactive materials.

The color, physical state, solubility, refractive index, specific gravity, melting point, boiling point, vapor pressure, viscosity, thermodynamic values, flash, fire, and autoignition temperatures, surface tension, dipole moments, and bibliographic source data are listed where applicable and available for a large number of air reactive chemicals.

AD-633 086 See Field 13J

PB-170 104 See Field 5C

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-449 743 Field 11H
CFSTI Price: HC$1.60
Rock Island Arsenal, Ill.
EVALUATION OF PRESENT METHODS OF DETERMINING THE SOAP CONTENT OF GREASES.
Technical rept.,
by Robert L. Peterson. 30 Jul 64, 11p Rept. no. 64-2363
Proj. DA-1-A-0-24401-A-107
N64 32572

Descriptors: (*Lubricants, Analysis), (*Greases, Analysis), (*Soaps, Greases), Test methods, Lubricant additives, Decomposition, Acetic acids, Aluminum soaps, Stearates, Quantitative analysis.

Identifiers: Metallic soaps.

Three methods of analysis were compared. They were: ASTM Method D128, ASTM D128 Supplementary Method using a Soxhlet apparatus with a paper extraction filter and a variation of ASTM D128 by substituting ten percent acetic acid for ten percent hydrochloric acid as the initial breakdown acid. The following information was obtained from this investigation: (1) The supplementary method of ASTM D128 has the best repeatability of the three methods evaluated except when used in the breakdown of an aluminum soap thickened grease. (2) There is no significant trend as to which acid breakdown method is better from the point of repeatability. (3) The digestion time is shortened by substituting acetic acid for hydrochloric acid as the initial breakdown acid except in the analysis of an aluminum soap thickened grease. (Author)

AD-632 713 Field 11H, 11F
CFSTI Prices: HC$2.00 MF$0.50
Rock Island Arsenal, Ill.
DRY LUBRICANTS AND CORROSION.
Technical rept.,
by Francis S. Meade and George P. Murphy, Jr.
5 Dec 62, 29p Rept. no. 62-4056
Prepared for presentation at annual meeting of Society of Automotive Engineers, Detroit, Mich., 14-18 Jan 63.

Descriptors: (*Lubricants, Reviews), (*Corrosion, Lubricants), Army equipment, Lubrication, Bonding, Friction, Wear resistance, Corrosion inhibition, Graphite.

Identifiers: Dry-film lubricants.

The paper discusses dry film lubricants from the standpoint of use by the military services, the Army in particular. For military purposes, a dry film lubricant is defined as a solid material which reduces friction and wear and at the same time provides corrosion protection. A summary of the types of dry lubricants and their desirable characteristics is given along with a discussion of the factors affecting the efficiency of the dry film lubricants. Recent work on the development of a dry film lubricant with a long wear life and corrosion protective properties is discussed. This work shows that graphite is not a desirable component in a dry film lubricant because it accelerates corrosion. The paper lists general applications for dry film lubricants and specific Ordnance applications such as on the XM34 Littlejohn Rocket Launcher. (Author)

AD-633 035 Field 11H
CFSTI Prices: HC$1.00 MF$0.50
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
EFFECT OF WATER ON HYDRAULIC BRAKE FLUID.
Interim rept.,
by Charles B. Jordan. May 66, 17p CCL-198
Proj. DA-1C024401A108

Descriptors: (*Hydraulic fluids, Moisture), Hydraulic brakes, Degradation, Transition temperature, Viscosity, Stability, Rubber, Oxidation, Corrosion inhibition, Additives, Performance (Engineering).

A study was made to determine the effect of absorbed moisture on the physical and chemical characteristics of polar type hydraulic brake fluids. Specific studies were carried out on the effect of moisture on equilibrium boiling point, flash point, cold temperature viscosity, oxidation stability, and effect on rubber with several polar brake fluids of varying chemical composition. Moisture produced the following effects - a. Boiling points are lowered in all brake fluids - drastically in so-called 'high boiling' fluids. b. Flash points are increased. c. Cold temperature viscosities are usually increased. d. The stability of the brake fluid toward oxidation is decreased. e. Rubber swelling and softening is decreased. (Author)

AD-633 068 Field 11H, 7C, 11I
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THERMAL DEGRADATION PROCESSES IN POLYSILOXANES AND THERMAL STABILIZATION BY A CERIUM INHIBITOR,
Interim rept.,
by C. M. Murphy, H. Ravner, and R. E. Kagarise.6 Apr 66, 26p NRL-6383
Projs. RR-007-08-44-5500, RR-001-01-43-4802

Descriptors: (*Hydraulic fluids, Siloxanes), (*Lubricants, Siloxanes), (*Silicone plastics, Pyrolysis), (*Siloxanes, Stabilization), Thermal stability, Lubricant additives, Cerium, Chemical reactions, Heat-resistant materials.

Studies were made of the effect of cerium on the degradation of polyorganosiloxanes (silicones) at 400C in the absence of oxygen. Thermally stressed polydimethylsiloxanes undergo -Si-O bond rupture, initiating anion-propagated degradation to cyclics and linear residues. One-hundred-percent polymethylphenylsiloxanes do not cyclize, but undergo rearrangements leading to crosslinking. In polydimethylsiloxanes, cerium is considered to form active sites which react reversibly

with anion fragments, thus limiting further degradation. Cerium has little effect on polymethylphenylsiloxanes, but stabilizes copolymers in direct ratio to the dimethyl content. The excellent response of polydimethyl and lightly phenylated siloxanes to cerium, together with their desirable physical properties, make their use attractive as high-temperature lubricants and hydraulic fluids in selected applications. (Author)

AD-633 263 **Field 11H**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Ock, Md.
SOME THERMODYNAMIC PROPERTIES OF CASTOR OIL VS TEMPERATURE AND PRESSURE,
by John M. Stallard. 14 Apr 66, 22p NOLTR-66-68
Task NOL-855/USRL

Descriptors: (*Vegetable oils, Thermodynamics), Temperature, Pressure, Volume, Compressive properties, Thermal expansion, Tables.

Specific volume, isothermal compressibility, and thermal expansion of Baker db-grade castor oil have been computed from an empirical equation fitted to data obtained by the differential transformer densitometer technique. Data is presented over a temperature range of 0-40C and a pressure range of 1-1000 bars. (Author)

N66-16158 **Field 11H**
CFSTI Prices: HC$1.00 MF$01.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SIMULATION OF THE J-2 ENGINE GIMBAL BEARING,
by K. E. Demorest, and K. W. Wilks. 20 Jan 66, 23p NASA-TM-X-53379

Descriptors: *Gimbal, *Glass fiber, *Teflon, *J- 2 Rocket engine, *Lubricant, *Phenol resin.

AD-632 730 **See Field 21B**

11I. PLASTICS

AD-632 712 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Natick Labs., Mass. Pioneering Research Div.
THERMAL CONDUCTIVITY OF POLYSTYRENE: SELECTED VALUES.
Technical rept.,
by Lois C. K. Carwile and Harold J. Hoge. Apr 66, 20p Thermal Conductivity-2
Proj. 1P014501B11A
USA-NLABS TR-66-27-PR

Descriptors: (*Styrene plastics, *Thermal conductivity), Reviews, Heat transfer, Transport properties, Thermal properties, Bibliographies.

The published literature on the thermal conductivity of polystyrene was assembled and the results critically evaluated. Best values of thermal conductivity as a function of temperature were selected. These are presented in both graphical and tabular form; the tables cover the range 240K to 540K and a few of the plotted points lie outside this range. An attempt was made to consult all work that could significantly affect the choice of best values. Published papers were located with the aid of Chemical Abstracts, Physics Abstracts, the Thermophysical Properties Retrieval Guide, and some other general sources. In addition, relevant references in the papers themselves were followed up until a substantially 'closed system' was generated, as shown by the fact that no new references were being turned up. (Author)

AD-633 041 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Army Medical Biomechanical Research Lab., Walter Reed Army Medical Center, Washington, D. C.
GLASS TRANSITION TEMPERATURES OF POLY ALKYL ALPHA CYANOACRYLATES.
Technical rept.,
by Harold J. Porter, and R. K. Kulkarni. Feb 66, 13p TR-6602
Proj. DA-3A013001A91C

Descriptors: (*Acrylic resins, Transition temperature), Phase studies, Glass, Dilatometers, Nitriles, Polymers.

Identifiers: Polycyanoacrylates.

The glass transition temperatures of a series of poly alkyl alpha cyanoacrylates were determined by the technique of dilatometry, using mercury as confining liquid to note the volume changes. (Author)

AD-633 389 **Field 11I, 13H, 9A**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Hudson Falls, N. Y. Capacitor Dept.
PRODUCTION ENGINEERING MEASURE POLYCARBONATE PLASTIC FILM.
Quarterly rept. no. 4, 18 Feb-18 May 66,
by Lawrence S. Lazar. 18 May 66, 19p
Contract DA-36-039-AMC-06165 (E)
See also AD-629 733.

Descriptors: (*Polyester plastics, *Dielectric films), Thickness, Friction, Additives, Tensile properties, Electrical properties, Capacitors, Manufacturing methods.

A slip polycarbonate film was made in gauges of .25 and .50 mil. This was produced without loss in mechanical or electrical strength. Biaxially oriented .25 and .50 mil polycarbonate film was produced by a direct process from the extruder through the drafting rolls and the tenter frame. At the .25 mil gauge trim take off is a little troublesome and some modifications are being made. (Author)

BDX-613-69 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.
THERMAL CHARACTERISTICS OF SOME RIGID URETHANE FOAMS,
by Clifford H. Smith. 7 Apr 65, 12p CONF-650902-1
Contract AT (29-1)-613
American Chemical Society National Meeting (150th), Atlantic City.

Descriptors: (*Isocyanate plastics, Thermal properties), (*Thermal insulation, Isocyanate plastics).

N65-24354 **Field 11I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
COMPARISON OF TWO INSTRUMENTS FOR DETERMINING HARDNESS OF ELASTOMERS,
by J. T. Schell, and C. D. Hooper. 26 Mar 65, 36p

NASA TMX-53226
Microfilmed from best available copy.

Descriptors: (*Elastomers, Hardness), (*Instrumentation, Plastics).

N66-18377 **Field 11I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
TIME-TEMPERATURE-STRAIN RATE EQUIVALENCE FOR VARIOUS ENGINEERING THERMOPLASTICS,
by J. J. Lohr. 1965, 38p NASA-TM-X-56266
Presented at the Intern. Symp. on High Speed Testing (5th), Boston, Mar 8-9, 1965.

Descriptors: *Acetal, *Fluorocarbon, *Mechanical property, *Polycarbonate, *Strain rate, *Polyamide.

PB-169 830 **Field 11I**
CFSTI Price: HC$5.60
Watertown Arsenal Labs., Mass.
A SURVEY OF THE ELEVATED TEMPERATURE PROPERTIES OF TEFLON AND KEL-F.
Technical note,
by A. P. Levitt and A. K. Wong. 24 Aug 56, 51p
WAL-397/9
Proj. DA-516-05-010

Descriptors: (*Heat-resistant plastics, Thermal properties), (*Halocarbon plastics, Thermal properties), Reviews, Mechanical properties, Electrical properties, Specific heat, Thermal properties, Pyrolysis, Volume, Thermal stability, Composite materials, Glass textiles.

The results of a literature survey on the elevated temperature thermal, mechanical, and electrical properties of Teflon and Kel-F are presented. Data on the following elevated temperature properties of these materials are reported: specific heat, thermal expansion, decomposition rate and decomposition products, specific volume, mechanical and electrical properties. The available data clearly indicate that at elevated temperatures Teflon is superior in thermal stability and mechanical properties to Kel-F. As was anticipated, new, unpublished elevated temperature data on thermal expansion and specific heat of Teflon, and specific volume of Kel-F were uncovered, thereby eliminating the need for further experimental measurements of these properties. Room temperature data on Duroid 5600, a material consisting of Teflon reinforced with glass fibers, are also included because by fiber reinforcement, the usefulness of Teflon may be extended at elevated temperatures. There are no elevated temperature data available on this material at the present time. (Author)

AD-632 666 **See Field 7E**

AD-632 762 **See Field 5A**

AD-632 958 **See Field 1E**

AD-632 964 **See Field 13A**

AD-633 068 **See Field 11H**

AD-633 086 **See Field 13J**

AD-633 169 **See Field 7D**

AD-633 208 **See Field 6M**

AD-633 236 **See Field 11D**

AD-633 245 **See Field 11D**

AD-633 358 **See Field 17B**

BDX-613-6 **See Field 11C**

PB-170 101 **See Field 5C**

11J. RUBBERS

AD-447 062 **Field 11J, 7C**
CFSTI Price: HC$3.60
Peninsular ChemResearch, Inc., Gainesville, Fla.
SYNTHESIS AND POLYMERIZATION OF FLUORINATED SULFUR MODIFIED NITROSO RUBBER.

Quarterly rept. no. 3, 1 Jan-31 Mar 64,
by Eugene C. Stump and Calvin D. Padgett. 15 May 64, 39p
Contract DA-19-129-AMC-152 (N)
See also AD-602 885.

Descriptors: (*Synthetic rubber, Synthesis (Chemistry)), (*Organic nitrogen compounds, Synthesis (Chemistry)), (*Organic sulfur compounds, Polymerization), Fluorine compounds, Chlorine compounds, Amines, Oxidation, Benzenes, Halogenated hydrocarbons, Copoly merization, Sulfides, Fluorination, Spectra (Infrared).

Identifiers: Nitroso rubber.

Continued efforts to synthesize CF3SNO and SF5NO are described. The first reported sulfur-containing nitroso compound, CF3SCF (NO)CF2C1, was prepared by the addition of nitrosyl chloride to CF3SCF=CF2. Oxidation of 4,4'-diaminooctafluorobiphenyl with performic acid did not give the desired dinitroso compound. The synthesis of 1,4-diaminotetrafluorobenzene is in progress. Larger scale preparations of C6F5NO, CF3SC1, CF3SCFC1CF2C1, SF5C1, and CF3SCF=CF2 were carried out. A 23 g. sample of CF3NO was prepared. Attempts to polymerize SF45CF=CF2 with CF3NO and CF3NO/CF2=CF2 were not successful. Attempts to polymerize CF3SCF=CF2 are described. (Author)

AD-633 058 **Field 11J, 7C**
CFSTI Prices: HC$2.00 MF$0.50
Peninsular Chem Research, Inc., Gainesville, Fla.
SYNTHESIS AND POLYMERIZATION OF FLUORINATED SULFUR MODIFIED NITROSO RUBBER.
Quarterly rept. no. 9, 1 Jul-26 Nov 65,
by Eugene C. Stump, and Ward H. Oliver. 21 Dec 65, 28p
Contract DA-19-129-AMC-152 (N),
Proj. DA-1K924401A113
See also AD-469 354.

Descriptors: (*Synthetic rubber, Synthesis (Chemistry)), (*Organic nitrogen compounds, Polymerization), (*Organic sulfur compounds, Polymerization), Fluorine compounds, Halogenated hydrocarbons, Butadienes, Ethylenes, Propenes, Spectra (Infrared).

Identifiers: Nitroso rubber.

Terepolymer samples containing 3 and 6 mole percent ONCF2CF2CO2CH3 with CF3NO and CF2=CF2 were prepared. A larger amount (280 g.) of 1,1,2-trifluorobutadiene terpolymer with CF3NO and CF2=CF2 was prepared. Terpolymers of CF2=CFCF2NO, CF2=CFCH2CF2CF2CH2CF=CF2 and ONCF2CF2CF2COOH with CF3NO and CF2=CF2 were prepared. Attempted copolymerization of carbonyl fluoride and hexafluoroacetone with CF3NO was unsuccessful. A 2-1. reactor equipped with stirrer and cooling coils has been procured and is being fitted with a refrigeration system. (Author)

AD-633 171 **Field 11J**
CFSTI Prices: HC$2.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
ROCK ISLAND ARSENAL ELASTOMER SYNTHESIS PROGRAM 1958-1966.
Technical rept.,
by Z. T. Ossefort. Apr 66, 38p
Proj. DA-1C014501B13A
RIA 66-1343

Descriptors: (*Elastomers, Reviews), (*Heat-resistant materials, Elastomers), (*Low-temperature research, Elastomers), Synthesis (Chemistry), Thermal stability, Silicone plastics, Boron compounds, Radiation chemistry, Butadienes, Styrene plastics, Acrylonitrile polymers, Isocyanate plastics, Polyester plastics, Inorganic polymers, Halocarbon plastics.

The Rock Island Arsenal Elastomer Synthesis Program for the period 1958-1966 is reviewed. Overall objectives and general approaches are covered. Detailed objectives, approaches, results and conclusions for twenty four projects are presented - fourteen internal and ten contracts. It is indicated that considerable progress has been made in the development of an elastomer having a combination of low temperature flexibility and resistance to hot oils. One of the biggest problems remaining is improvement in thermal stability of elastomers. Several research problems in this area which might have future potential are listed. (Author)

N66-15770 **Field 11J**
CFSTI Prices: HC$4.00 MF$1.00
Peninsula Chemresearch, Inc., Gainesville, Fla.
DEVELOPMENT OF VULCANIZABLE ELASTOMERS SUITABLE FOR USE IN CONTACT WITH LIQUID OXYGEN.
Annual summary rept. no. 2, 9 May 64-8 May 65,
by P. D. Schuman. 8 Jun 65, 146p CPB-02-1163-63
Contract NAS8-5352
NASA CR-69544

Descriptors: *Elastomer, *Fluorine compound, *Liquid oxygen (Lox), *Polymer chemistry, *Thermal property, *Vulcanizate.

N66-16969 **Field 11J**
CFSTI Prices: HC$4.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
MECHANICAL PROPERTIES OF CROSSLINKED POLY (METHYL METHACRYLATE) POLYMERS UNDER SPACE ENVIRONMENTAL CONDITIONS.
Final rept. 1 Jun 63 - 30 Jan 66,
by J. E. Frederick, T. L. Smith, and N. W. Tschoegl. 30 Jan 66, 104p
Contract NASr-49 (13)
NASA CR-70201

Descriptors: *Mechanical property, *Cross linking, *Polymethyl methacrylate, *Stress relaxation.

OTR-138 **Field 11J**
National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
SYNTHESIS OF THERMALLY STABLE ELASTOMERS.
Apr 66, 16p
Westinghouse Electric Corp., Baltimore, Md.

Descriptors: (*Elastomers, Synthesis (Chemistry)), Heat-resistant materials, Polymers, State-of-the-art reviews, Esters, Vulcanization, Copolymerization, Inorganic compounds, Siloxanes, Silicates, Silicon compounds, Boron compounds, Fluorine compounds, Silicone plastics, Organic nitrogen compounds, Dienes, Ethers.

Significant reports covering the period since 1960 were selected for this study with reference to relevant earlier works. Recent Government-sponsored research and development (R and D) in high temperature elastomers has been directed along two lines: (1) new polymer synthesis and (2) evaluation of compounds to improve the thermal stability of current elastomers. Progress has been made in each of these areas. Large groups of inorganic and semi-inorganic polymer systems were evaluated. Systems included silazanes, siloxanes, and fluorocarbons. (Author)

11K. SOLVENTS, CLEANERS, AND ABRASIVES

AD-633 212 **Field 11K**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
SURFACE ACTIVE PROPERTIES AND DETERGENCY OF SOLUTIONS OF VARIOUS SYNTHETIC WASHING AGENTS AND OF DETERGENTS PREPARED FROM THEM,
by F. V. Nevolin, T. G. Tipiseva, V. A. Polyakova, A. M. Semenova, and N. N. Vanina. May 66, 10p FSTC-HT-23-81-66
Proj. 2301-6553
TT 66-61278
Trans. of Masloboino-Zhirovaya Promyshlennost (USSR) v30 n11 p26-9 1964.

Descriptors: (*Cleaning compounds, Physical properties), Surface tension, Effectiveness, Sulfates, Alcohols, Organic sulfur compounds, Sulfonates, Electrolytes, USSR, Surface-active substances.

The surface tension and wetting ability of various materials is discussed. The properties of alkyl sulfates made from alcohols obtained from coconut and spermaceti oils, synthines, and synthetic alcohols; A azolate; NP-1 sulfonol; ceryl benzene sulfonol; alkyl sulfonate, etc. are examined. The effect of the addition of electrolytes to the detergents is studied. (Author)

PB-170 163 **See Field 5C**

11L. WOOD AND PAPER PRODUCTS

PB-170 015 **See Field 5C**

PB-170 062 **See Field 5C**

PB-170 068 **See Field 5C**

PB-170 069 **See Field 5C**

PB-170 071 **See Field 5C**

PB-170 075 **See Field 5C**

PB-170 077 **See Field 5C**

PB-170 082 **See Field 5C**

PB-170 083 **See Field 5C**

PB-170 097 **See Field 5C**

PB-170 124 **See Field 5C**

PB-170 135 **See Field 5C**

PB-170 140 **See Field 5C**

PB-170 171 **See Field 5C**

PB-170 172 **See Field 5C**

PB-170 180 **See Field 5C**

PB-170 182 **See Field 5C**

PB-170 183 **See Field 5C**

PB-170 185 **See Field 5C**

PB-170 188 **See Field 5C**

PB-170 194 **See Field 5C**

PB-170 267 **See Field 5C**

12A. MATHEMATICS AND STATISTICS

AD-462 615 **Field 12A**
CFSTI Prices: HC$1.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.

LOWER BOUNDS FOR EIGENVALUES OF A QUADRATIC FORM RELATIVE TO A POSITIVE QUADRATIC FORM.
Technical memo.,
by D. W. Fox, N. W. Bazley and W. Borsch-Supan.Feb 65, 15p TG-657
Contract NOw-62-0604-c
Prepared in cooperation with Battelle Institute, Geneva (Switzerland) and Johannes Gutenberg Univsitaet, Mainz (West Germany).

Descriptors: (*Polynomials, Numerical analysis), (*Numerical analysis, Polynomials), Calculus of varia tions, Buckling (Mechanics), Elasticity.

This article presents a method for the calculation of lower bounds to eigenvalues of operators that arise from variational problems for one quadratic form relative to a positive definite quadratic form. Eigenvalue problems of this kind occur, for example, in the theory of buckling of continuous linear elastic systems. (Author)

AD-472 220 **Field 12A**
CFSTI Prices: HC$1.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
A METHOD FOR ORDERING FUNCTIONAL VALUES OF MONOTONIC FUNCTIONS DEFINED ON ORDERED n-TUPLES OF INTEGERS.
Technical memo.,
by V. G. Sigillito. Jul 65, 15p TG-683
Contract NOw-62-0604-c

Descriptors: (*Functional analysis, Numerical methods ; procedures), (*Numerical methods ; procedures, Functional analysis).

This report discusses a general procedure for ordering the values of a function of ordered n-tuples of integers when the given function is increasing in each variable. Such functions and the need to order their values arise, for example, when differential eigenvalue problems are solved by separation of variables. In this case the ordered functional values are the ordered eigenvalues of the problem.

AD-632 707 **Field 12A, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
STABLE MOTIONS OF THE LINEAR ADIABATIC OSCILLATOR.
Technical note,
by Robert B. Kelman and Niel K. Madsen. Mar 66, 19p TN-BN-436
Contract Nonr-595

Descriptors: (*Differential equations, Numerical analysis), Linear systems, Oscillators, Equations of motion, Stability, Functions, Mechanics.

This paper studies the real solutions of the differential equation y prime+(1+f+h cos 2nx)y = 0 where f (x) is an absolutely integrable function, h (x) is a function of bounded variation and n is a positive constant. By a 'solution' of the eq. is meant a function which has an abolutely continuous first derivative and which satisfies the eq. almost everywhere.

AD-632 784 **Field 12A, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
A MODEL OF DISPERSIVE NON-LINEAR EQUATION.
Research rept.,
by Nobuo Yajima, Akizi Outi, and Tosiya Taniuti.Feb 66, 21p IPPJ-47

Descriptors: (*Nonlinear differential equations, *Model theory), Magnetohydrodynamics, Equations of motion, Japan.

In this paper we consider a model of dispersive non-linear equation; which is derived from the Schrodinger equation by means of a non-linear transformation. The derivation is closely analogous to deriving the Burgers model from the diffusion equation. Then we obtain a solution resulting from an initial discontinuity, which corresponds to that of the Riemann's problem in the Burgers model. In the solution so obtained the limit that the Planck constant vanishes is discussed in comparison with the dissipative limit in the Burgers model which is realized by letting a dissipation constant tend to zero. It is shown explicitly that in these limits equations in the two models are same nevertheless their solutions are entirely different; for example, as is well known in the Burgers model one discontinuity develops from the initial discontinuity whilst in our model two discontinuities develop, across each of which the so-called generalized Rankine-Hugoniot relations are not valid.

AD-632 898 **Field 12A, 20K, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
MACHINE COMPUTATION OF TRIGONOMETRIC EXPANSIONS,
by David Bushnell, and Wayne A. Madsen. May 65, 27p SUDAFR-235
Contract AF 49 (638)-1276
AFOSR 66-0128

Descriptors: (*Programming (Computers), *Series), (*Trigonometry, Series), Fourier analysis, Solids, Mechanics, Iterative methods.

A new technique for the computer solution of problems in solid mechanics is introduced, and an example of the large deflections of a spherical cap is used to illustrate the method. Coding systems can be established through which powers of trigonometric series are expanded by the computer. The method is particularly suited to problems involving the minimization of potential energy with respect to undetermined coefficients. If long series expansions of the dependent variables are needed for adequate convergence, hand computation of the potential energy expression in terms of the undetermined coefficients is too tedious. (Author)

AD-633 061 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Operations Research Center, Univ. of Calif., Berkeley.
AN ORTHOGONALIZATION METHOD OF COMPUTING THE GENERALIZED INVERSE OF A MATRIX,
by C. R. Glassey. Apr 66, 18p ORC-66-10
Contracts Nonr-222 (83), DA-31-124-ARO (D)-331,
Projs. NR-047-033, RR-003-07-01
AROD 5307:11
Research supported in part by NSF, grant NSF-G-P-4593.

Descriptors: (*Matrix algebra, Theory), Transformations (Mathematics), Functional analysis, Operators (Mathematics).

Identifiers: Generalized matrix inverse.

A method of computing the generalized inverse of a matrix is derived from the behavior of a linear transformation and its generalized inverse relative to the range and null space of the operator. The method utilizes the gram-schmidt procedure to obtain an orthogonal basis for the column space of the matrix, and then the biorthogonalization technique of Hestenes to obtain the inverse of a matrix that has the same rank as the original. A matrix multiplication then yields the required generalized inverse. (Author)

AD-633 082 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
California Univ., Los Angeles. Dept. of Mathematics.
CAPACITY FUNCTIONS IN RIEMANNIAN SPACES.
Technical rept.,
by Wellington Ham Ow. Jun 66, 71p TR-42
Grant DA-AROD-31-124-G742,
Projs. DA-20011501B704, AROD-1517-M
AROD 1517:91

Descriptors: (*Algebraic topology, *Potential theory), (*Functions, Algebraic topology), Boundary value problems, Green's functions, Measure theory.

The existence of the capacity function in an arbitrary noncompact Riemannian space is proved and the capacity is then defined for boundary components as well as the ideal boundary. Moreover, the capacity function of the ideal boundary is shown to possess certain extremal properties. An equivalence relation between the capacity of the ideal boundary, the Green's function, and the harmonic measure of the ideal boundary is given. Certain criteria are given which then enable one to determine under what conditions the capacity of a boundary component is zero. The extremal length of a family of curves is discussed and certain basic theorems involving it are stated. (Author)

AD-633 140 **Field 12A, 14D**
CFSTI Prices: HC$2.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
INEQUALITIES FOR LINEAR COMBINATIONS OF ORDER STATISTICS FROM RESTRICTED FAMILIES,
by R. E. Barlow, and Frank Proschan. Feb 66, 48p D1-82-0506, Mathematical note-451
Also available from the author.

Descriptors: (*Reliability, Statistical analysis), (*Inequalities, *Statistical distributions), Combinatorial analysis, Stochastic processes, Life expectancy, Linear programming.

Identifiers: Order statistics.

Comparisons are obtained between a linear combination of order statistics from a distribution F and a corresponding linear combination from a distribution G where G-1F is (a) convex, and (b) star-shaped. The results have applications in life testing where the underlying distribution has monotone failure rate or monotone failure rate on the average. (Author)

AD-633 204 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Texas A and M Univ., College Station.
MULTIPLE QUADRATURE BY MONTE CARLO TECHNIQUES.
Master's thesis,
by John Dietrich Voss. May 66, 81p
Contract AF 33 (608)-1284

Descriptors: (*Monte Carlo method, *Numerical analysis), Stochastic processes, Statistical distributions, Integrals, Programming (Computers).

Identifiers: Theses, Quadrature formulae.

AD-633 215 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
AN EFFICIENT TECHNIQUE FOR THE CALCULATION OF VELOCITY-ACCELERATION PERIODOGRAMS.
Technical note,
by Edward M. Hofstetter. 18 May 66, 12p TN-1966-31
Contract AF 19 (628)-5167, ARPA Order-498
ESD TR-66-208

Descriptors: (*Statistical analysis, Algorithms), Velocity, Acceleration, Time, Series.

Identifiers: Periodograms, Cooley-Tukey method.

The Cooley-Tukey method for greatly reducing the number of computations required to evaluate a velocity periodogram has been extended to the evaluation of velocity-acceleration periodograms. For N data points, this method requires approximately a factor of 2/3 N fewer computations than would be required by straightforward evaluation of the periodogram. (Author)

AD-633 333 **Field 12A**
CFSTI Prices: HC$1.10 MF$0.50
Diamond Ordnance Fuze Labs., Washington, D. C.
A NOTE ON ZERO CROSSINGS AND AVERAGE FREQUENCY.
Technical rept.,
by P. R. Karr. 25 Oct 54, 12p TR-133
Proj. DA-5140
Presented at the Watertown Conference of Arsenal Mathematicians, Watertown Arsenal, October 29, 1954.

Descriptors: (*Statistical functions, Distribution theory), Stochastic processes, Frequency.

Identifiers: Zero crossings.

AD-633 393 **Field 12A, 9D**
CFSTI Prices: HC$6.00 MF$1.25
Stanford Univ., Calif. Dept. of Statistics.
A NEW APPROACH OF TIME SERIES WITH MIXED SPECTRA.
Technical rept. no. 17 for May 66,
by George R. Hext. 16 May 66, 241p
Grants DA-ARO (D)-31-124-G726, NSF-GS-142,
Proj. 2025
AROD 2025:16
Research supported in part by NSF, Grant NSF-GP-4265.

Descriptors: (*Statistical analysis, *Series), Fourier analysis, Integrals, Distribution functions, Signal-to-noise ratio, Frequency, Detection, Harmonic analysis.

Identifiers: Time series analysis, Spectral analysis, Theses.

The time series considered have jumps in their spectral distribution function; that is, the series is the sum of a 'signal' component, comprising a finite linear sum of pure sine-waves, and a 'noise' component, having continuous spectral density function. Given a set of observations from such a time series the primary problem is to estimate the 'signal' frequencies, the power in each component of the signal, and the 'noise' spectral density at these frequencies. The essence of the method used is as follows. For a given set of observations from such a series, and for each frequency that might yield a signal component, several estimates of the spectral density are made, using spectral windows of different bandwidths. To a first approximation, the noise component of the estimate is the same for every window, while the part of the estimate due to the signal is inversely proportional to the bandwidth of the window. Thus using a regression technique, one can separate the signal power from the noise spectral density at the given frequency and estimate these two quantities. These ideas are developed as follows. After a historical introduction, the early part of the thesis is devoted to the 'probability' aspects of the problem. First some results are proved that apply to the 'noise' series or any stationary time series. They give extensions and refinements of early approximations for the expected value of the spectral estimate, and for the covariance between two spectral estimates; these include the rates at which the limiting values are attained.

N66-16085 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
North Carolina Univ., Chapel Hill. Computation Center.
COMPUTER-ORIENTED AND DIFFERENTIAL EQUATIONS STUDIES.
Progress rept. 1 Oct 64-21 Apr 65,
by J. W. Hanson. 16 Jul 65, 41p
Contract NAS8-1528
NASA CR-69715

Descriptors: *Digital computer, *Space flight, *Spacecraft guidance, *Operational problem.

ORNL-3909 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
THE MINIMUM SIGNIFICANT NUMBER OF SUCCESSES IN A BINOMIAL SAMPLE,
by Marvin A. Kastenbaum, and K. O. Bowman. Feb 66, 68p
Contract W-7405-eng-26

Descriptors: (*Sampling, Binomials), (*Binomials, Tables).

PB-169 329 **Field 12A, 5B**
Centre National de la Recherche Scientifique, Paris (France). Centre d'Etudes pour la Traduction Automatique.
ETUDES STATISTIQUES SUR LE CORPUS RUSSE,
by J. Perriault. Jun 62, 55p CETAP-17
Availability: Reference only at CFSTI after original stock is exhausted. NSF Scientific Documentation Project. Text in French.

Descriptors: (*Statistical analysis, Documentation), France.

AD-466 352 **See Field 20K**

AD-466 359 **See Field 9B**

AD-467 992 **See Field 20K**

AD-632 674 **See Field 8G**

AD-632 929 **See Field 1B**

AD-632 930 **See Field 1B**

AD-632 994 **See Field 15E**

AD-633 046 **See Field 20D**

AD-633 199 **See Field 20D**

N66-15472 **See Field 5J**

ORNL-3746 **See Field 20H**

ORNL-3881 **See Field 9B**

PB-169 212 **See Field 5B**

12B. OPERATIONS RESEARCH

AD-632 795 **Field 12B, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
FRACTIONAL BROWNIAN MOTION, SELF-SIMILAR PROCESSES, AND APPLICATIONS,
Technical rept.,
by Benoit B. Mandelbrot and John W. Van Ness. 1 Mar 66, 44p TR-15
Grant DA-ARO (D)-31-124-G726, DA-ARO (D)-31-124-G363,
Proj. DA-20014501B14C
AROD 2025:15

Descriptors: (*Brownian motion, *Statistical processes), Probability.

A family of Gaussian processes, called fractional Brownian motion, which arise naturally from an examination of the conditions of validity of the central limit theorem, is studied. Fractional Brownian motion possesses an important property of 'self-similarity.' This property leads to a more general class of processes, not necessarily Gaussian, called self-similar processes. This paper is addressed to mathematicians, scientists, and engineers; the material is arranged in order of increasing mathematical sophistication. (Author)

AD-633 008 **Field 12B, 5C**
CFSTI Prices: HC$3.00 MF$0.75
George Washington Univ., Washington, D. C. Logistics Research Project.
THE APPLICATION OF LINEAR PROGRAMMING TO MEDIA SELECTION.
Scientific rept.,
by Steven A. Frank. 7 Jun 66, 91p Serial T-186
Contracts Nonr-761 (03), Nonr-761 (05),
Projs. NR-345-107, NR-047-001,
Tasks 03, 05

Descriptors: (*Linear programming, *Decision making), Commerce, Operations research.

Identifiers: Theses, Advertising.

The purpose of this paper is to determine whether the application of linear programming leads to wise and intelligent decisions in the area of media selection. A brief review of several of the formulative and computational techniques of linear programming is presented. The application of these techniques by the Young and Rubicam and by the Batten, Barton, Durstine, and Osborn advertising agencies to media selection is then analyzed on both a conceptual and on an empirical basis. The conclusion reached is that, if applied with full knowledge of its limitations, linear programming can be extremely beneficial in the area of media selection. (Author)

AD-633 066 **Field 12B**
CFSTI Prices: HC$5.00 MF$1.00
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.
ESTIMATION OF THE LAPLACE TRANSFER FUNCTION FROM SAMPLED DATA.
Technical memo.,
by Fred W. Smith, and W. Bruce Hilton. 30 Nov 65, 182p EDL-M874
Contract DA-28-043-AMC-00379 (E)

Descriptors: (*Functions, *Integral transforms), Control systems, Sampling, Dynamics, Statistical analysis.

This report describes the results of a study and experimental evaluation which were undertaken to compare methods for estimating the Laplace transfer function of a time-invariant linear system when given only the normal input and output of the system which has been obscured by noise and is in sampled-data form. In the theoretical study the transfer-function estimation methods described in current literature were reviewed. The most promising of these methods are given in the report. In addition to the current techniques, the study has developed an improved method for estimating the Laplace transform in certain situations. The experimental evaluation was made by using the most promising current techniques and the new techniques in two typical examples. The results of this evaluation indicate that certain of the current techniques are decidedly superior to others and that the new method offers a definite improvement over previous methods for estimating the Laplace-transfer function from sampled data. (Author)

AD-633 067 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
PROBLEM SIZE IN LINEAR PROGRAMMING,
by Victor Klee. Feb 66, 17p D1-82-0507, Mathematical note-452
Also available from the author.

Descriptors: (*Optimization, *Linear programming), Convex sets.

This is a progress report covering recent attempts to estimate the size of linear programming problems. Such estimates could be very useful as a guide to practical computation and as an aid in choosing among alternate methods of solution. However, the results at present are far from complete, and many unsolved problems remain. (Author)

AD-633 089 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
SOME RESULTS IN DELAY-DIFFERENTIAL SYSTEMS,
by Gene A. Kemper. Apr 66, 25p D1-82-0519, Mathematical note-458
Also available from the author.

Descriptors: (*Time - lag theory, *Differential equations), Control systems.

Significant advances in automatic control theory have utilized a powerful technique due to A. M. Liapunov, the so-called Liapunov's direct method. Recent extensions of control theory include time-lag control systems, that is, control systems described by delay-differential systems (sometimes called differential equations with past history). In such investigations the existence of periodic or almost periodic behavior is often of importance. Such investigations afford one possible application of the ensuing work. (Author)

AD-633 282 **Field 12B, 5A**
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
A CONVEX APPROXIMANT METHOD FOR NON-CONVEX EXTENSIONS OF GEOMETRIC PROGRAMMING.
Management sciences research rept.,
by A. Charnes, and W. W. Cooper. 5 May 66, 12p MSRR-76
Contract Nonr-760 (24),
Proj. NR-047-048
Prepared in cooperation with Northwestern University under contract Nonr-1228 (10), proj. NR-047-021 and contract DA-31-124-ARO (D)-322, SRM-152.

Descriptors: (*Mathematical programming, *Management engineering), Convex sets, Approximation (Mathematics).

Identifiers: Geometric programming.

Many important problems of engineering and management are of a form which could be represented as geometric programs except that the functional to be minimized as well as the constraints are not confined to posynomials in that some of the coefficients are negative. This paper supplies a way for dealing with such negative terms by a constraint adjunction procedure which yields an associated approximating problem involving only polynomials which can, in turn, be transformed into a convex programming problem that has only one local (= global) optimum. The latter, which is called a convex approximant, has an associated dual. Recourse to the related duality theory then supplies guidance for improving the approximation along lines that are indicated in the paper. (Author)

AD-633 427 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
Research Analysis Corp., McLean, Va.
STATISTICAL DECISION ANALYSIS OF STOCHASTIC LINEAR PROGRAMMING PROBLEMS.
Technical paper,
by Jerome Bracken, and Richard M. Soland. Feb 66, 30p RAC-TP-199
Contract DA-44-188-ARO-1

Descriptors: (*Linear programming, *Stochastic processes), (*Decision theory, Linear programming), Monte Carlo method, Distribution theory.

This paper presents a statistical decision analysis of a one-stage linear programming problem with deterministic constraints and stochastic criterion function. Procedures for obtaining numerical results are given that are applicable to any problem having this general form. After stating the statistical decision problems to be considered, the expected value of perfect information and the expected value of sample information are discussed. In obtaining these quantities, use is made of the distribution of the optimal value of the linear programming problem with stochastic criterion function; therefore Monte Carlo and numerical integration procedures for estimating the mean of this distribution are discussed. The case in which the random criterion vector has a multivariate Normal distribution is presented separately, and more detailed methods are offered. (Author)

PB-169 134 **Field 12B**
CFSTI Prices: HC$4.00 MF$0.75
Systems Research Center, Case Inst. of Tech., Cleveland, Ohio.
MULTI-LEVEL DECOMPOSITION FOR THE OPTIMIZATION OF COMPLEX STATIC SYSTEMS.
Thesis,
by Jerome D. Simon. 1965, 105p SRC-75-A-65-28
Grant NSF-GP-642

Descriptors: (*Optimization, Systems engineering), (*Systems engineering, Optimization), Algorithms, Numerical analysis, Partial differential equations.

Identifiers: Decomposition theory, Theses.

The scope of this thesis deals with the static optimization of complex systems. Of major concern is the case where high dimensionality and interaction make it unfeasible to solve the problem using an integrated approach. Classical Lagrange Multiplier theory is presented emphasizing the significance of the multipliers. Inequality constraints are incorporated by extending the role of the multipliers. With the multipliers treated as parameters the Lagrangian is decomposed to realize the benefits obtained from a multi-level formulation of the problem. The utilization of additional decomposition variables enables complex systems with non-separable objective functions to be imbedded into Lagrangian functions which are easily decomposed. A two level structure is considered where the first level consists of relatively small independent subsystems derived from the Lagrangian Decomposition, and the second level coordinates the action of the first by adjusting parameters (multipliers). An iterative scheme is derived to solve the resulting set of less formidable subproblems which yields the solution to the original integrated problem. Proofs are given which determine sufficiency conditions for the convergence of the algorithm. (Author)

ACF-5 **See Field 7D**

AD-632 731 **See Field 9B**

AD-632 801 **See Field 15G**

AD-632 972 **See Field 9B**

AD-632 992 **See Field 15E**

AD-633 281 **See Field 5A**

ANL-7073 **See Field 18I**

ANL-7109 **See Field 9B**

ANL-7129 **See Field 9B**

ORNL-3877 **See Field 9B**

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-632 963 **Field 13A, 13M, 15C**
CFSTI Prices: HC$3.00 MF$0.75
General American Research Div., General American Transportation Corp., Niles, Ill.
PREPRODUCTION PROTOTYPE PACKAGE VENTILATION KIT, SECOND STRUCTURAL AND HUMAN FACTORS TEST.
Final rept.,
by Basil A. Libovicz, Robert R. Neveril, and Herman F. Behls. Aug 65, 95p GARD-1278-4.2
Contract OCD-PS-64-22
Subcontracted to Stanford Research Inst., Calif., Contract B-70925 (4949A-28)-US.

Descriptors: (*Fallout shelters, *Ventilation), Portable, Civil defense systems, Cooling + ventilating equipment, Tests, Human engineering, Performance (Engineering), Specifications.

A portable ventilation system, designed for fallout shelters, was manually operated continuously for two weeks. The Package Ventilation Kit (PVK) evaluated included a Fan Assembly plus two Drive Modules. A previous test had disclosed some mechanical weaknesses that were subsequently changed. The modified PVK functioned without any failures; therefore, Specification MIL-V-40645, 'Package Ventilation Kit, 20-Inch Fan, Modular Drive (Civil Defense)', was issued 16 August 1965. Minor improvements to this specification are recommended.

AD-632 964 **Field 13A, 13M, 13K, 11I**
CFSTI Prices: HC$3.00 MF$0.75
General American Research Div., General American Transportation Corp., Niles, Ill.
FRICTION LOSS IN FLEXIBLE PLASTIC AIR DUCT.
Final rept.,
by Robert B. Neveril, and Herman F. Behls. Oct 65, 72p GARD-1278-2
Subcontracted to Stanford Research Inst., Calif., Contract B-70925 (4949A-28)-U.S.

Descriptors: (*Fallout shelters, Ventilation), (*Ventilation ducts, Polyethylene plastics), (*Pipes, Friction), Civil defense systems, Pressure, Flexible structures, Skin friction, Reduction, Gas flow, Cooling + ventilating equipment.

Tests were conducted to determine the pressure drop characteristics of 20-inch diameter, 4-mil thick, polyethylene tubing and both factory and shelter fabricated 90-degree elbows. The tests were performed at flow rates ranging from 1300 to 4100 cubic feet per minute. These plastic components are part of a portable ventilation system that was developed for Civil Defense fallout shelters, Specification MIL-V-40645. Fully inflated 20-inch diameter plastic tubing has about three-quarters of the pressure drop of sheet-metal duct. However, the last fifty feet of a plastic duct system, which is not completely inflated, has 1-1/2 to 3 times the pressure drop per foot of fully inflated plastic tubing. The result is that for duct systems over 100 feet long the pressure drops for sheet-metal and plastic tubing are approximately the same. The friction losses for both factory fabricated and shelter fabricated elbows were established. A 40-inch, smooth radius, 90-degree factory fabricated elbow is recommended for use with the Civil Defense Package Ventilation Kit. This elbow develops a pressure drop equivalent to 50 feet of straight tubing. The best shelter fabricated elbow is a three-piece elbow with a radius of 60 inches that can be fabricated from the straight tubing and tape stocked in the Package Ventilation Kit. This elbow develops a pressure drop equivalent to 90 feet of straight tubing. (Author)

AD-633 233 Field 13A, 13M, 5E
CFSTI Prices: HC$3.00 MF$0.75
General American Research Div., General American Transportation Corp., Niles, Ill.
EXPERIMENTAL PROTOTYPE PACKAGE VENTILATION KIT, FIRST STRUCTURAL AND HUMAN FACTORS TEST.
Interim rept., 29 Mar-12 Apr 65,
by Basil A. Libovicz, and Herman F. Behls. May 65, 71p GARD-1278-4.1
Contract OCD-PS-64-201
Subcontracted to Stanford Research Inst., Menlo Park, Calif., Contract B-70925 (4949A)-US.

Descriptors: (*Fallout shelters, *Ventilation), Performance (Human), Operation, Performance (Engineering), Design, Cooling + ventilating equipment.

A structural test and human limit evaluation of the shelter Package Ventilation Kit (PVK) showed that the ventilator can be readily operated for periods of at least three hours with 7-1/2 minutes rest each half-hour. The PVK can be operated at pedal speeds from 45 to 63 RPM, and the preferred speed was 55 RPM. The optimum power input was found to be 0.10 horsepower per operator, and the maximum tested was 0.15. Most tests were performed at comfortable conditions, 68 to 72 F effective temperature (ET). The maximum ET imposed was 83 F. Further tests are required to establish work/rest cycles when operating the PVK at elevated ET's.

13B. CIVIL ENGINEERING

AD-633 253 Field 13B, 13M
CFSTI Prices: HC$3.00 MF$0.75
Wyoming Univ., Laramie.
A WIND TUNNEL STUDY OF VELOCITY PROFILES BEHIND A MODEL SNOW FENCE.
Master's thesis,
by Warren B. McCormick. Jun 66, 70p
Contract AF 33 (608)-1295

Descriptors: (*Snow, Dynamics), Wind tunnels, Tests, Velocity, Models (Simulations), Control.

Identifiers: Theses.

AD-632 802 See Field 8M
AD-632 864 See Field 8H
AD-632 865 See Field 6E
AD-632 990 See Field 5A
AD-633 266 See Field 9B
PB-169 751 See Field 5C
PB-170 044 See Field 5C
PB-170 095 See Field 5C
PB-170 112 See Field 5C
PB-170 118 See Field 5C
PB-170 157 See Field 5C
PB-170 164 See Field 5C
PB-170 168 See Field 5C
PB-170 173 See Field 5C
PB-170 175 See Field 5C
PB-170 186 See Field 5C
PB-170 191 See Field 5C
PB-170 262 See Field 5C

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

AD-632 822 Field 13C
CFSTI Prices: HC$1.00 MF$0.50
Orloff (Arthur) and Associates, Nunda, N. Y.
LIGHT WEIGHT CABLE IMPLANTER.
Final technical rept.,
by Arthur Orloff and Guthrie B. Stone. Feb 66, 21p
Contract DA-44-009-AMC-1297 (T)

Descriptors: (*Earth-handling equipment, Performance (Engineering)), Maneuverability.

Identifiers: Cable implanters.

A description of engineering tests, and the test results of the Cable Implanter are presented, along with a discussion of performance of the saw, transmission, and the handling characteristics for personnel. The report concludes and recommends that: by the use of a hinged frame in this device its maneuverability and therefore its specific applicability would be greatly enhanced. (Author)

AD-633 266 See Field 9B
PB-170 070 See Field 5C
PB-170 080 See Field 5C
PB-170 180 See Field 5C
PB-170 182 See Field 5C

13D. CONTAINERS AND PACKAGING

AD-632 990 See Field 5A
AD-633 214 See Field 11F
AD-633 255 See Field 19A
BDX-613-56 See Field 11A

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

N66-15767 Field 13E
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill.
ENVIRONMENTAL STUDY OF MINIATURE SLIP RINGS.
Quarterly rept. no. 9, 1 Jul-1 Oct 65,
by O. M. Kuritza. 1965, 16p E6000-26
Contract NAS8-5251
NASA CR-69540

Descriptors: *Environmental testing, *High vacuum, *Ring structure, *Slip band, *Material testing.

13F. GROUND TRANSPORTATION EQUIPMENT

AD-632 989 See Field 18F
AD-632 990 See Field 5A

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-633 311 Field 13G
CFSTI Prices: HC$3.00 MF$0.75
Astromechanics Research Div., Giannini Controls Corp., Malvern, Pa.
DEVELOPMENT OF TECHNIQUES FOR THE STATIC AND DYNAMIC ANALYSIS OF FLUID STATE COMPONENTS AND SYSTEMS.
Final rept. 1 Mar-31 Oct 65,
by C. A. Belstering. Feb 66, 83p ARD-FR-037
Contract DA-44-177-AMC-284 (T),
Task 1P121401A14186
USAAVLABS TR-66-16

Descriptors: (*Fluid amplifiers, Analysis), Design, Systems engineering, Circuits, Statics, Dynamics, Fluid flow, Performance (Engineering), Mathematical models.

The report describes development of analytical techniques necessary for design of systems using fluidic components. It covers the analytical and experimental work on five separate tasks intended to extend the usefulness of previously conceived methods. The results lead to the following conclusions: (1) Valid equivalent circuits were developed to describe the dynamic behavior of most fluid amplifiers. (2) These equivalent circuits are useful for frequencies from zero through 2000 cps. (3) The validity of certain methods previously developed for evaluating equivalent circuit elements was confirmed. (4) Static characteristic curves of amplifier performance of the type developed under the program can be normalized, thereby minimizing the number of sets of curves necessary to describe the behavior of an amplifier. (5) The mathematical model derived for a simple impedance element is valid for low values of through-flow; additional work is needed to modify it for high through-flow values. (Author)

N66-15788 Field 13G
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Space Power and Propulsion Section.
DEVELOPMENT OF ELECTRICAL SWITCHGEAR FOR SPACE NUCLEAR ELECTRICAL SYSTEMS.
Quarterly progress rept no. 4, 4 Sep 4-Dec 65,
by A. H. Powell. 1966, 65p
Contract NAS3-6467
NASA CR-54861

Descriptors: *Actuator, *Switching element, *Test facility.

N66-16921 Field 13G
CFSTI Prices: HC$4.00 MF$0.75
Research Labs. Div., Bendix Corp., Southfield, Mich.
ANALYTICAL STUDY OF THE FEASIBILITY OF A PNEUMATIC NEUTRON FLUX DETECTOR.
May 65, 113p BRLD-2933
Contract NAS3-6207
NASA CR-54468

Descriptors: *Neutron flux, *Pneumatic equipment, *Radiation detector, *Thermal neutron.

N66-17279 Field 13G
CFSTI Prices: HC$4.00 MF$0.75
Research Labs. Div., Bendix Corp., Southfield, Mich.
ANALYTICAL STUDY OF THE FEASIBILITY OF A PNEUMATIC NEUTRON FLUX DETECTOR.
Final rept.
May 65, 113p BRLD-2933
Contract NAS3-6207
NASA CR-54468

Descriptors: *Fluid amplifier, *Neutron flux, *Pneu matic equipment, *Radiation detector, *Thermal neutron.

13H. INDUSTRIAL PROCESSES

AD-632 831 Field 13H
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.

DEVELOPMENT OF PRACTICE FOR COMPOSITE ROLLING OF STRUCTURAL METAL PANELS.
Quarterly rept. no. 1,
by J. R. Van Orsdel, E. S. Bartlett, K. R. Grube, andH. R. Ogden. Apr 66, 31p Rept. no. G-7515
Contract DA-19-066-AMC-308 (X),
Proj. DA-A1-65-11111-01-A1-AW
AMRA CR-66-02/1

Descriptors: (*Sandwich panels, *Rolling (Metallurgy)), Welding, Bonding, Maraging steels, Stainless steel, Molybdenum alloys, Nickel alloys, Carbon alloys, Nitric acid, Composite materials.

Identifiers: Inconel (Alloys), Stainless steel PH 14-8 Mo.

The program concerns the development of practice for panel fabrication from five specific materials. Inconel, PH 14-8Mo, and maraging 18Ni-250 were studied during the first quarter. Preliminary sandwich panels of vertical-rib design were prepared from the three alloys with encouraging results. Refinement of surface-preparation techniques and preservation of clean surfaces until bonds are formed were found to be necessary to produce satisfactory bonding. Filler materials can be leached routinely with nitric acid without harm to Inconel and PH 14-8Mo structure, but care must be taken to avoid dissolution of the maraging structure. Acid concentrations of approximately 80 per cent should be maintained when leaching carbon-steel filler from maraging-steel structures, and bath temperatures should not be allowed to rise above 140 F. The three alloys can be fabricated into structural panels by roll welding. However, compositional differences between alloys are undoubtedly responsible for bond-quality differences. The most readily formed bonds were in Inconel, followed by 18Ni-250 and PH 14-8Mo. (Author)

AD-632 890 **Field 13H, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Linden Labs., Inc., State College, Pa.
MACHINING HIGH PURITY ALUMINA.
Quarterly rept. no. 5, 28 Jun-28 Sep 65.
28 Oct 65, 24p

Contract DA-36-039-AMC-03634 (E)
See also AD-628 013.

Descriptors: (*Refractory materials, Machining), (*Machining, *Ceramic materials), (*Aluminum compounds, Oxides), Inorganic acids, Fluorides, Sintering, Purification, Density.

Identifiers: Aluminum oxides, Hydrogen fluoride.

The rate of attack by 52% aqueous hydrofluoric acid on commercial grades of high purity alumina (96% and 94%) are discussed. The composition and the method of formation used appear to be parameters controlling the rate of attack. All 96% and 94% alumina engineering parts have been rendered friable by hydrofluoric acid treatment, machined and reconstituted. The 96% alumina parts have physical properties which suggest that they have been successfully reconstituted when fired to P.C.E. cone 33 (1745C) for four hours and were simultaneously transformed into parts of at least 99% alumina or better. Although the 94% alumina has been capable of being rendered friable and machinable it has not been successfully reconstituted. Reconstitution at P.C.E. cone 33 resulted in dense bodies which were warped and distorted. The warping of plates, cylinders and rods was not improved upon by reconstituting under the less severe conditions of P.C.E. cone 31 (1680C); in addition they had an open pore porosity of about 8% and, hence, would be unsatisfactory when measured against Mil I-10 A. (Author)

AD-632 955 **Field 13H, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Springfield Armory, Mass.
RESONANT FREQUENCY METHOD FOR NONDESTRUCTIVE EVALUATION OF SINTERED POWDER METAL AND INVESTMENT CAST PRODUCTS.
Technical rept.,
by K. A. Fowler, and H. P. Hatch. 6 Mar 66, 27p
SA-TR19-1516
Proj. DA-1C014501B32A

Descriptors: (*Castings, Non-destructive testing), (*Non-destructive testing, Resonant frequency), (*Powder metallurgy, Non-destructive testing), Powder metals, Sintering, Ultrasonic properties, Tensile properties, Ultrasonic radiation, Sound transmission.

Identifiers: Investment casting.

The initial phase of a continuing study of nondestructive test methods for potential application to sintered powdered metals is described. Measurements of natural mechanical resonant frequency and ultrasonic velocity have been successfully applied to the nondestructive evaluation of tensile strength of sintered iron test specimens. Empirical relationships between tensile strength and the velocity of sound propagation have been developed. These relationships are based on the fact that the disposition of residual porosity, which includes the size, shape, and distribution of the pores, simultaneously influences both the tensile strength and sonic velocity of sintered iron powder compacts. (Author)

AD-633 037 **Field 13H, 11A, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
ADHESIVE BONDING OF NICKEL AND NICKEL-BASE ALLOYS.
Technical memo.,
by R. E. Keith, R. E. Monroe, and D. C. Martin.
Oct 65, 78p
Contract DA-01-021-AMC-11651 (Z)
NASA TM-X-53428, RSIC 480

Descriptors: (*Bonding, *Nickel alloys), (*Nickel, *Bonding), Adhesives, State-of-the-art reviews, Specifications, Bonded joints.

Nickel and nickel-base alloys can be successfully adhesive bonded using presently available techniques and adhesives. Relatively little work has been done on adhesive bonding of nickel-base alloys, however, because most nickel-base alloys are used at temperatures above the present maximum service temperatures of organic adhesives or under corrosive conditions. Inorganic adhesives of sufficient ductility and low enough maturing temperatures have not been developed to compete effectively with brazing and welding for joining high-temperature structures. The preparation of the metal surfaces prior to bonding has a marked effect on the strength and quality of the joints obtained. Particular attention must be given to metal-surface preparation for joints intended to be used at elevated temperatures or at cryogenic temperatures. For successful production of quantitites of adhesive-bonded assemblies having uniformly high mechanical properties, careful inspection and quality-control procedures are essential throughout the manufacturing process. Continual monitoring of adhesive characteristics, compositions of surface-preparation solutions, adjustment of processing equipment; accuracy of process control instruments, and testing of joints is essential. (Author)

AD-633 038 **Field 13H, 11C, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
SURFACE TREATMENTS FOR TITANIUM ALLOYS.
Technical memo.,
by Manley W. Mallett. Oct 65, 80p
Contract DA-01-021-AMC-11651 (Z)
NASA TM-X-53429, RSIC 506

Descriptors: (*Titanium alloys, *Coatings), Protective treatments, Metal coatings, Plating, Ceramic coatings, Paints, Lubricants, Mechanical working, Surfaces, Thermal radiation.

The report describes procedures that have been developed for the surface treatment of titanium alloys. It was not possible to obtain conclusive information on the relative utility of the various coatings. Therefore, information has been included on all coating systems for which reports of significant development work were available, without attempting to assess the usefulness of the particular coating or to compare it with similar coatings applied by other techniques. Coating processes which are described include mechanical treatments, electrochemical treatments, treatments for applying metallic coatings other than electroplating, and treatments for applying hard, nonmetallic coatings. Special treatments to control thermal radiation are also described. (Author)

AD-633 039 **Field 13H, 11F**
CFSTI Prices: HC$6.00 MF$1.25
Battelle Memorial Inst., Columbus, Ohio.
THE MAKING OF NICKEL AND NICKEL-ALLOY SHAPES BY CASTING, POWDER METALLURGY, ELECTROFORMING, CHEMICAL VAPOR DEPOSITION, AND METAL SPRAYING,
by J. G. Kura, V. D. Barth, W. H. Safranek, E. T. Hall, and H. McCurdy. Oct 65, 229p
Contract DA-01-021-AMC-11651 (Z)
NASA TM-X-53430, RSIC 478

Descriptors: (*Nickel, *Material forming), (*Nickel alloys, Material forming), (*Powder metallurgy, Nickel alloys), Casting, Electroforming, Vapor plating, Metal coatings, Sprays, State-of-the-art reviews, Sintering, Coatings, Corrosion inhibition, Corrosion-resistant alloys, Cobalt alloys, Chromium alloys, Molybdenum alloys, Aluminum alloys, Titanium alloys, Iron alloys.

The state of the art of making nickel and nickel-alloy shapes by methods other than machining from wrought materials is reviewed. The methods covered are casting, powder metallurgy, electroforming, chemical vapor deposition, and metal spraying. Of these methods, casting and electroforming are the most extensively used for making final shapes of nickel or nickel alloys. Powder-metallurgy methods are being used to make pure nickel strip for special applications. Special alloys such as nickel dispersion strengthened with throrium oxide, Monel, and others are made from powders in the forms of strip and extrusions. Nickel-alloy shapes are readily made by powder-metallurgy methods, and it is expected that the recently increased availability of prealloyed powders may result in more use of this versatile process. Chemical vapor deposition has found little application in making nickel shapes since it has little to recommend it over electroforming. Metal spraying has been essentially limited to application of wear-resistant and/or corrosion- and oxidation-resistant coatings to other metals. (Author)

AD-633 040 **Field 13H, 11F**
CFSTI Prices: HC$5.00 MF$1.00
Battelle Memorial Inst., Columbus, Ohio.
THERMAL AND MECHANICAL TREATMENTS FOR NICKEL AND SELECTED NICKEL-BASE ALLOYS AND THEIR EFFECT ON MECHANICAL PROPERTIES,
by C. J. Slunder, and A. M. Hall. 20 Apr 66, 167p
Contract DA-01-021-AMC-11651 (Z)
NASA TM-X-53443, RSIC 489

Descriptors: (*Nickel, *Heat treatment), (*Nickel alloys, *Heat treatment), (*Mechanical working, *Nickel alloys), Annealing, Stress relieving, Hardening, Hot working, Cold working, Mechanical properties, Chromium alloys, Cobalt alloys, Molybdenum alloys, Aluminum alloys, Titanium alloys, Cryogenics, Iron alloys.

Identifiers: Monel K-500, Inconel (Alloys), Rene 41 (Alloy), Waspalloy, Udimet 500, Hastellog (Alloys).

The thermal and mechanical treatments to which nickel and nickel-base alloys are usually subjected are discussed, with particular emphasis directed to the influence of these operations on mechanical properties. Equipment and procedures are described, as well as the problems likely to be encountered and the precautions and corrective measures available. In addition to wrought nickel, the nickel-base alloys that are included in the discussion constitute a group of commercial alloys considered to be of particular interest in missile and aerospace applications. (Author)

AD-633 205 **Field 13H, 5A**
CFSTI Prices: HC$4.00 MF$0.75
Texas Technological Coll., Labbock. Dept. of Industrial Engineering.
A HEURISTIC SOLUTION TECHNIQUE FOR NEAR OPTIMAL PRODUCTION SCHEDULES.
Master's thesis,
by Herbert George Campbell. May 66, 110p
Contract AF 33 (608)-1285

Descriptors: (*Production control, *Optimization), Scheduling, Algorithms, Management planning, Industrial production.

Identifiers: Theses.

AD-633 247 **Field 13H, 11F**
CFSTI Prices: HC$6.00 MF$1.25
Battelle Memorial Inst., Columbus, Ohio.
WELDING PROCEDURES FOR TITANIUM AND TITANIUM ALLOYS,
by J. J. Vagi, R. E. Monroe, R. M. Evans, andD. C. Martin. Oct 65, 233p
Contract DA-01-021-AMC-11651 (Z)
NASA TM-X-53432, RSIC 470

Descriptors: (*Titanium, *Welding), (*Titanium alloys, *Welding), State-of-the-art reviews, Brazing, Cleaning, Welds, Airframes, Containers, Structural parts, Armor, Vehicles, Hulls (Marine).

The report covers the state of the art of welding procedures for titanium and its alloys. Methods employed in the past and present are described. Many of the conventional welding and brazing processes are used for joining titanium and its alloys. Information on the use of these processes, when available, was condensed or extracted and included in this report. Necessary additional processing such as preweld cleaning, joint preparation, postweld cleaning, and postweld operations are also included since they form an integral part of the welding processes without which successful welding cannot be accomplished. Joining processes that have been used only experimentally also are described briefly. The need for proper preweld cleaning operations and proper shielding to prevent contamination of titanium welds is emphasized throughout. (Author)

AD-633 340 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Pitman-Dunn Research Labs., Frankford Arsenal, Philadelphia, Pa.
ULTRASONIC IN-PROCESS INSPECTION OF RESISTANCE SPOT WELDS.
Final rept.,
by George E. Burbank, and Wallace D. Taylor. Apr 66, 49p
Proj. DA-1C024401A110
FA R-1811

Descriptors: (*Spot welds, Non-destructive testing), (*Non-destructive testing, *Ultrasonic radiation), Resistance welding, Quality control, Piezoelectric crystals, Ductility, Conductivity.

In the continued evaluation of the in-process ultrasonic approach to the nondestructive inspection of resistance spot welds, ultrasonic through-transmission measurements were extended to several types of metals to establish signal sensitivity and behavior with respect to metallurgical changes. In addition, the test results are reviewed from the standpoint of meaningful trends and reproducibility required for the development of go-no go or absolute measurement type quality control devices. (Author)

N66-17274 **Field 13H**
CFSTI Prices: HC$6.00 MF$1.50
Hughes Aircraft Co., El Segundo, Calif. Space Systems Div.
SURVEYOR SPACECRAFT SYSTEM. VOLUME II. FINAL STERILIZATION REPORT-APPENDICES,
by R. J. Varga. Jun 63, 246p SSD-3373R-Vol-2
Contract NAS7-100
NASA CR-70397

Descriptors: *Sterilization, *Surveyor project, *Spacecraft.

N66-18097 **Field 13H**
CFSTI Prices: HC$7.00 MF$1.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
ALUMINUM WELD DEVELOPMENT COMPLEX CONFERENCE, JANUARY 19, 1966,
1966, 326p NASA-TM-X-57215

Descriptors: *Aluminum, *Conference, *Welding.

N66-18160 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Materials Research Corp., Orangeburg, N. Y.
FABRICATION AND DELIVERY OF NON-DESTRUCTIVE READ OUT MEMORY BUFFERS USING LAMINATED LAYER TECHNIQUE.
Quarterly progress rept. no. 1,
by T. P. Janus and N. Kenny. 13 Sep 65, 28p
MRC-520
Contract NAS8-11986
NASA CR-70511

Descriptors: *Laminated material, *Memory storage unit, *Readout, *Magnetic metal, *Metal.

N66-18181 **Field 13H**
CFSTI Prices: HC$6.00 MF$1.25
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
EVALUATION OF THIN WALL SPACECRAFT ELECTRICAL WIRING. VOLUME II-TEST RESULTS AND FACILITIES.
Technical rept. no. 1,
by L. J. Frisco and K. N. Mathes. 28 Jul 65, 204p
Contract NAS9-4549
NASA CR-65233

Descriptors: *Corrosion resistance, *Electric insulation, *Spacecraft electronic equipment.

N66-18367 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
FABRICATION AND PRESSURIZATIONS TECHNOLOGY FOR IMPROVEMENT OF SURFACE ACCURACY OF PASSIVE COMMUNICATIONS SATELLITES,
by W. E. Bressette and D. C. Grana. 1965, 22p
NASA-TM-X-56394
Presented at the Aerospace Expandable Struct. Conf. (2nd), Minneapolis, May 25-27, 1965.

Descriptors: *Communications satellite, *Passive satellite, *Conference, *Pressurization, *Surface geometry.

AD-632 698 **See Field 9A**

AD-632 709 **See Field 9A**

AD-632 837 **See Field 13J**

AD-632 868 **See Field 18E**

AD-632 928 **See Field 9E**

AD-632 993 **See Field 5A**

AD-633 009 **See Field 9A**

AD-633 012 **See Field 9A**

AD-633 057 **See Field 9A**

AD-633 062 **See Field 9A**

AD-633 141 **See Field 9A**

AD-633 143 **See Field 13I**

AD-633 147 **See Field 9A**

AD-633 206 **See Field 5A**

AD-633 213 **See Field 11D**

AD-633 260 **See Field 13M**

AD-633 322 **See Field 9A**

AD-633 389 **See Field 11I**

LA-3424 **See Field 18D**

NLCO-968 **See Field 18J**

PB-170 099 **See Field 5C**

PB-170 100 **See Field 5C**

PB-170 101 **See Field 5C**

PB-170 122 **See Field 5C**

PB-170 527 **See Field 5C**

TID-21663 **See Field 11F**

13I. MACHINERY AND TOOLS

AD-633 143 **Field 13I, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Autonetics, Anaheim, Calif.
DEEP-WATER METAL-CUTTING TORCH.
Final rept. add. to phase 1.
17 May 66, 8p C5-2121/32
Contract NObs-92585,
Proj. SR007-09-04,
Task 875
See also AD-624 167.

Descriptors: (*Torches, *Underwater cutting), Performance (Engineering), Liquids, Oxidizers, Fuels, Stainless steel, Metal plates, Hazards, Safety, Deep submergence.

The validity of the concept of an underwater cutting torch using a liquid oxidizer and fuel has been further substantiated by this supplemental effort. Underwater control of starts, stops, and restarts without the use of a gaseous purge has been demonstrated. Additional underwater cuts have been made and sufficient information defining design parameters for the prototype model, to be fabricated in Phase II of this program, has been acquired. It is apparent from the results of this investigation that any changes in orifice size, configuration, or flow control result in requirements for additional experimentation to obtain proper conditions for cutting. Of prime importance is the fact that a very high mixture ratio of oxidizer of fuel must be used to achieve burning of the metal. There were some initial unsuccessful attempts to perform cutting where it was evident that more than adequate preheat capacity was available (the metal began to melt) but not enough excess oxidizer was present to burn the metal. (Author)

AD-633 146 **Field 13I, 20A**
CFSTI Prices: HC$5.00 MF$1.00
Franklin Inst. Research Labs., Philadelphia, Pa.

AN ANALYTICAL AND EXPERIMENTAL STUDY OF THE STRUCTUREBORNE AND AIRBORNE VIBRATION OF ROLLING ELEMENT AND SLIDING SURFACE BEARINGS.
Final technical rept.,
by H. C. Rippel, and J. H. Rumbarger. 31 Mar 66, 141p Rept. no. F-A2321
Contract NObs-77184
See also AD-411 437.

Descriptors: (*Bearings, Vibration), (*Noise, Bearings), Airborne, Roller bearings, Acceleration, Loading (Mechanics), Experimental data, Noise analyzers, Sound transmission, Programming (Computers).

An analytical and experimental study was made of bearing noise and vibration generation and transmission. Presented herein is; summary of previously reported work, report of most recent progress, conclusions drawn from all of the work accomplished, recommendations for additional work. This final technical report coupled with the numerous periodic progress reports and special interim reports issued during the course of the program treats all aspects of the following three phases of effort; (a) Analytical study of bearing noise and vibration generation and transmission, (b) Design and construction of a test device to experimentally evaluate bearing structureborne and airborne vibration. (c) Experimental evaluation of bearing structureborne and airborne vibration. (Author)

N66-15887 **Field 13I**
CFSTI Prices: HC$2.00 MF$0.50
College of Aeronautics, Cranfield (England). Instrumentation and Automation Section.
POSITION TRANSDUCERS FOR NUMERICALLY CONTROLLED MACHINE TOOLS,
by C. J. Charnley, and M. Healy. Dec 64, 32p
COA-NOTE-M and P-6

Descriptors: *Machine tool, *Numerical control, *Positioning equipment, *Transducer.

AD-633 238 **See Field 11A**

13J. MARINE ENGINEERING

AD-632 821 **Field 13J**
CFSTI Prices: HC$4.00 MF$0.75
HITCO, Gardena, Calif.
INVESTIGATION OF CLOSURES AND CLOSURE ATTACHMENTS FOR GRP CYLINDRICAL DEEP SUBMERGENCE VESSELS.
Final rept. 18 Jan 65-15 Apr 66,
by D. Abildskov. 15 Apr 66, 121p
Contract NObs-92186,
Proj. SR-007-03-04,
Task 1008

Descriptors: (*Underwater vehicles, Deep submergence), (*Hemispherical shells, Titanium), (*Structural shells, Deep submergence), Glass textiles, Cylindrical bodies, Spheres, Plastics, Composite materials, Hydrostatic pressure, Reinforcing materials, Tests.

Identifiers: Deep submergence vessels.

The objectives of the program were to evaluate glass reinforced plastic (GRP) spheres and cylindrical shells with titanium hemispherical closures for deep diving submersible vessels. The design operating depth was 20,000 feet (8889 psi). Filament wound spherical models having a 6 inch ID and cylindrical models having hemispherical end closures 6 inches ID by 20 inches cylindrical shell length were designed, fabricated, and externally hydrostatic pressure tested both statistically and cyclic (fatigue). A total of eight spherical models were evaluated, six of which were tested hydrostatically to failure and two cyclic to failure. The spherical models were fabricated from both SHTS glass and hollow glass with U. S. Polymeric E787 epoxy resin. All spherical models had two titanium reinforced openings. Three cylindrical shell models of sandwich wall construction (SHTS/E787 faces and hollow glass/E787 core) were evaluated, one was tested hydrostatically to failure and two were subjected to 5000 cycles (one minute dwell at operating pressure) prior to hydrostatic testing to failure. All models were instrumented with strain gages so that analytical and experimental strains could be compared. (Author)

AD-632 837 **Field 13J, 13H**
CFSTI Prices: HC$1.10 MF$0.50
Department of the Navy, Washington, D. C.
PROTECTION OF SHIPS' HULLS AGAINST CORROSION,
by V. M. Stepanov. 1966, 10p Trans-953
TT 66-61256
Trans. of Morskoi Sbornik (USSR) n4 p65-71 1961.

Descriptors: (*Hulls (Marine), *Corrosion inhibition), USSR, Coatings, Electrochemistry, Cathodes (Electrolytic cell), Cathodic protection, Anodes (Electrolytic cell), Sea water, Zinc, Magnesium, Aluminum alloys, Zinc alloys, Copper alloys.

AD-633 086 **Field 13J, 11B, 11I, 11E, 11G**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
ON MATERIALS OF THE EXPOSITION SYNTHETIC MATERIALS IN SHIPBUILDING,
by E. K. Shvedov. 1966, 7p Translation-1033
TT 66-61267
Trans. of Sudostroenie (USSR) n6 p57-9 1964.

Descriptors: (*Materials, Ships), (*Ship structural components, *Glass textiles), (*Plastics, *Ship structural components), USSR, Hulls (Marine), Fittings, Propellers (Marine), Ship auxilary equipment, Marine engineering, Lighting equipment.

The article describes the USSR exhibit entitled Synthetic Materials in Shipbuilding which is dedicated to the nonmetallic materials used in shipbuilding. Included are: hull construction, fittings and appointments, propellers, equipment and compartmentation of ship spaces, ships lighting system and fabrication.

AD-633 114 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
SHIP MOTIONS.
Memorandum rept.,
by W. L. Roberts. 25 Apr 66, 16p NRL-MR-1692
Proj. RT-8801-008/6521/W3512X

Descriptors: (*Ships, Motion), Roll, Pitch (Motion), Time, Data, Tankers, Cargo ships, Destroyers, Patrol craft, Merchant vessels, Spectrum signatures, Tables.

Data, primarily from literature, are tabulated showing the magnitude of roll and pitch and the periods of these motions for several types of ships. (Author)

AD-633 273 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
GENERAL VIBRATION CHARACTERISTICS OF A GLASS PLASTIC SHIP,
by V. D. Popov, and S. V. Sochinskii. 1966, 9p
Translation-1057
TT 66-61287
Trans. of Sudostroenie (USSR) n2 p17-20 1965.

Descriptors: (*Ships, Vibration), Plastics, Glass textiles, Oscillation, Ship hulls, Frequency, Damping, Shear stresses, USSR.

It is mandatory that shear be taken into consideration when calculating the frequencies of free oscillations and the amplitudes of the forced oscillations in plastic ships. Ignoring shear results in errors of up to 15% in determining the first tone of the oscillation, and of up to 50% for the second, when determining the frequencies of the free oscillations. The high damping characteristics of a plastic ship's hull make it undesirable to compute the free oscillations for the higher tones. At frequencies of disturbing forces higher than the frequencies of the third to fourth tones the deformation of the shear becomes the basic factor determining the magnitude of the amplitude of the forced vibration. The use of computers makes it easy to overcome the difficulties involved in making the calculations connected with the need to take the effect of the internal inelastic resistance and the shear into consideration. (Author)

AD-632 991 **See Field 18N**

AD-633 087 **See Field 8C**

AD-633 341 **See Field 13M**

PB-170 084 **See Field 5C**

PB-170 166 **See Field 5C**

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

N66-17285 **Field 13K**
CFSTI Prices: HC$3.00 MF$0.75
Liquid Rocket Operations, Aerojet-General Corp., Sacramento, Calif.
DEVELOPMENT OF LARGE SIZE BELLOWS FACE TYPE SEALS FOR LIQUID OXYGEN AND OXYGEN/ HYDROGEN HOT GAS SERVICE AT MODERATE TO HIGH PRESSURES,
by T. Pasternak and E. Roesch. 10 Feb 66, 85p
AGC-8800-16
Contract NAS3-2555
NASA CR-54818

Descriptors: *Coolant, *Cryogenic fluid, *Sealing, *Turbopump, *Hot gas.

AD-632 964 **See Field 13A**

PB-170 165 **See Field 5C**

13L. SAFETY ENGINEERING

AD-633 049 **See Field 1B**

13M. STRUCTURAL ENGINEERING

AD-633 260 **Field 13M, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
STRUCTURAL CHARACTERISTICS OF SHEET METAL EMBOSSED WITH AN IRREGULAR DESIGN.
Research and development rept.,
by W. A. Tewes Jr. Apr 66, 42p MEL-111/66
Proj. S-R011-01-01,
Task 0401

Descriptors: (*Sheets, Structural properties), Weight, Deformation, Configuration, Mechanical working, Structures, Brass, Steel, Mechanical properties.

To reduce weight but not strength of structures, the use of sheet metal stiffened by an embossed design instead of heavier plain metal sheets is well known. The characteristics and the potential of a particular stiffened sheet were investigated. An L-shaped element (dimple) was chosen to be embossed in 0.062-inch-thick sheet metal in a multielement pattern. Under simple bending conditions, the substitution of dimpled sheets for plain sheets of the same stiffness realized a weight reduction of 18 to 59 percent. An equation for the deflection of the dimpled sheets could not be developed because there is no established theory to which the deflections would comply when the

sheets were loaded to produce an anticlastic surface. The principal deficiency of the dimpled sheet is the anisotropic elastic properties that result from the pattern arrangement and discontinuity of the elements. (Author)

AD-633 339 Field 13M
CFSTI Price: MF$0.50
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
STATIC AND DYNAMIC TESTS OF BURIED UNREINFORCED CONCRETE ARCHES.
Miscellaneous paper (Final rept.),
by W. J. Flathau, and G. D. Meyer. Apr 66, 22p MP-1-809

Descriptors: (*Underground structures, Concrete), (*Loading (Mechanics), Underground structures), Curved profiles, Land, Soil mechanics.

The objective of this study was to determine the response of semicircular, unreinforced concrete fixed-end arches of varying stiffness buried in dense dry sand when subjected to both static and dynamic loads. Two sets of three arches all having outside diameters of 12 in. were cast with one arch in each set having wall thicknesses of 1/2, 1, and 2 in. The maximum static ground surface overpressure applied was 550 psi, and the maximum dynamic overpressure was 270 psi. For most of the tests, the depth of sand over the crown of the arch was 2 in. The modes of response for the structures tested statically and dynamically were the same. However, only the 1/2-in. arch loaded statically collapsed. From strain measurements it was determined that the arches responded in compression. From the results it was possible to write expressions including the effects of soil arching for predicting overpressures to cause failure of the type arches described in this paper. (Author)

AD-633 341 Field 13M, 13J
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
THE INFLUENCE OF SHEAR DEFORMATIONS AND ROTATORY INERTIA ON THE NATURAL FREQUENCIES OF BEAMS.
Technical memo.,
by Charles G. Culver. May 66, 23p MEL-TM-4/66
Proj. S-R011-01-01,
Task 0401

Descriptors: (*Vibration, *Beams (Structural)), Shear stresses, Deformation, Moment of inertia, Mathematical analysis.

Characteristic equations, including the effects of shear and rotatory inertia, for determining the natural frequencies of simple beams are derived. These equations are presented in tabular form for a variety of boundary conditions. (Author)

N66-10602 Field 13M
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Electric Corp., Baltimore, Md. Defense and Space Center.
NASA INDUSTRIAL APPLICATIONS STUDY. INDUSTRIAL REVIEW FOR FILAMENT-WOUND PLASTIC, HIGH-VOLTAGE TRANSMISSION TOWER,
by R. N. Sampson. 4 Dec 64, 12p
Contract NASw-952
NASA CR-67797

Descriptors: *Filament winding, *Plastic material, *Transmission line.

N66-18314 Field 13M
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass.
INITIAL POST-BUCKLING BEHAVIOR OF TOROIDAL SHELL SEGMENTS,
by J. W. Hutchinson. Nov 65, 37p SM-6
Grant NaG-559
NASA CR-66057

Descriptors: *Buckling, *Compression buckling, *Toroidal shell.

AD-632 963 See Field 13A

AD-632 964 See Field 13A

AD-632 990 See Field 5A

AD-633 233 See Field 13A

AD-633 253 See Field 13B

PB-170 157 See Field 5C

PB-170 186 See Field 5C

14A. COST EFFECTIVENESS

AD-633 256 Field 14A, 5A
CFSTI Prices: HC$2.00 MF$0.50
Electronic Systems Div., L. G. Hanscom Field, Mass.
ADVANTAGEOUS DEFINITIONS CONCERNING VALUE,
by Bert Decker. Apr 66, 37p ESD-TR-66-282

Descriptors: (*Value engineering, Semantics), (*Management engineering, Value engineering), (*Cost effectiveness, Value engineering), Linguistics, Standardization, Armed forces procurement, Industrial production.

Advantageous definitions of Value Engineering (VE), Value Engineering Management (VEM), Value Management (VM), and Traditional Management (TM) are given to simplify discussion and communications and stress the specific actions required to optimize the value of military systems and motivate industrial management. (Author)

AD-633 336 See Field 5A

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-402 407 Field 14B
CFSTI Prices: HC$2.60
Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOME TESTS OF IONIZATION GAUGES,
by F. T. Worrell. 18 Feb 63, 30p Technical rept. no. TR-298
Contract AF 19 (628)-500, ARPA order-85

Descriptors: (*Ionization gages, Tests), Vacuum pumps, Electrodes, Magnetrons, Sensitivity, Stability, Effectiveness.

Comparisons are made between ionization gauges of the Bayard-Alpert and Nottingham designs and Redhead's cold-cathode magnetron gauge. Conclusions are drawn about the reliability of each of these under various conditions. Observations on the effectiveness of the screen in Nottingham's gauge are reported. Miscellaneous effects, such as interactions between gauges, are noted. (Author)

AD-632 828 Field 14B, 20D
CFSTI Prices: HC$1.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
FLOW QUALITY IMPROVEMENT AT MACH 8 IN THE VKF 50-INCH HYPERSONIC WIND TUNNEL B.
Technical rept. for Mar 65-Feb 66,
by C. R. Fitch. May 66, 23p AEDC-TR-66-82
Contract AF 40 (600)-1200,
Proj. ARO-VT 3116
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Hypersonic wind tunnels, Performance (Engineering)), Design, Hypersonic characteristics, Wind tunnel nozzles, Nozzle throats, Machining.

Flow quality within the 50-in. hypersonic tunnel at a nominal Mach number of 8 is discussed. The nozzle and throat were recently remachined to closer tolerances which resulted in improved test section flow quality. Measurements of the contoured nozzle ordinates and Mach number distributions are presented along with results from method of characteristics solutions of design and actual measured wall contours. (Author)

AD-632 832 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
THE CASCADE IMPACTOR FOR PARTICLE-SIZE ANALYSIS OF AEROSOLS,
by J. M. Pilcher, R. I. Mitchell, and R. E. Thomas. 1955, 25p
Sponsored by Army Chemical Corps, Frederick, Md. Prepared for presentation at Aerosol Div., Chemical Specialities Manufacturers Assoc., Roosevelt Hotel, New York, 5-7 Dec 55.

Descriptors: (*Aerosols, Particle size), Test equipment, Design, Calibration, Operation, Effectiveness.

Identifiers: Cascade impactors.

The design, calibration, and operation of the cascade impactor is considered. Basic theory of operation, special design features, laboratory methods of analysis, and practical applications of the instrument are reviewed. This instrument is found to be well adapted for size analysis of aerosols composed of particles from 0.1 to 20 microns in diameter. Some applications of the cascade impactor toward improving the effectiveness of commercial aerosols, such as insecticides and paint sprays, are proposed. (Author)

AD-632 924 Field 14B, 20D
CFSTI Prices: HC$2.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
LAUNCHING OF FOAMED-PLASTIC MODELS WITH A TWO-STAGE LIGHT-GAS GUN.
Rept. for 9 Dec 63-1 Feb 65,
by A. B. Bailey, and K. E. Koch. May 66, 28p
AEDC-TR-66-60
Contract AF 40 (600)-1200,
Proj. ARO-VK3080
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Aerodynamic characteristics, Test methods), (*Drag, Test facilities), Spheres, Conical bodies, Light gas guns, Superaerodynamics, Model tests, Expanded plastics, Ballistics, Hypervelocity projectiles.

Techniques were developed to launch ultralightweight models (i.e., densities on the order of 1 lb/3 cu. ft.) from a two-stage light-gas gun. To date, spheres and cones have been launched with some success. The purpose of the development was to determine whether useful aerodynamic data (e.g., sphere drag) could be obtained in a short aeroballistic range at pressures on the order of 0.01 mm Hg. A number of spheres were launched in support of this effort, some at pressures as low as 0.03 mm Hg. There is good agreement between these measurements of sphere drag coefficient and those produced in low-density wind tunnels. The application of this technique to a longer range having a lower pressure capability, say, 0.001 mm Hg, would permit measurements to be made in the near-free-molecule flow regime. (Author)

AD-632 927 Field 14B, 9A
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J. Electronic Components Lab.
A MECHANICAL SHOCK PULSE SURVEY.
Technical rept.,
by Francesco Palmisano, and Louis Leo Kaplan.-
Mar 66, 45p
Proj. DA-1P6-22001-A-055,
Task 1P6-22001-A-055-01
ECOM 2647A-Rev

Descriptors: (*Test equipment, *Shock (Mechanics)), (*Electronic equipment, Test equipment, Shock resistance, Impact shock, Instrumentation, Data, Drop testing.

A mechanical shock pulse survey of the shock pulse shapes produced by eight mechanical shock machines used in the evaluation of electronic piece parts is discussed. The shock machines include the general types of free-fall, pendulum, and cam-activated. The shock pulses range in nominal time duration of the major positive pulse from 0.60 to 32.00 milliseconds and peak amplitudes from 40 to 1150 gravitational units. Details of the recording and instrumentation techniques employed to obtain survey data are presented. Instrumentation calibration and problems of undershoot are also discussed, as is the reduction of the raw data from their original collected form to a form suitable for analysis and storage. The methods of analysis, quantitative and qualitative, of the shock pulse curves obtained from the eight mechanical shock machines surveyed were to first determine shock pulse curves's amplitudefrequency spectrum by use of a special-purpose analog computer which is designed specifically to compute Fourier integrals. The frequency spectrum is then converted to a Bode Diagram from which a graphical comparison of the shock pulse is made. Analysis of the results of the mechanical shock pulse survey shows that major characteristics of the amplitude-frequency spectrum of each mechanical shock machine surveyed are mainly dependent on peak amplitude, shock pulse duration, and the area under the shock pulse curve. (Author)

AD-633 104 Field 14B, 22B, 8N, 4A
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
AEROSPACE INSTRUMENTATION: COMPILATION OF ABSTRACTS.
Rept. no. 2 on work assignment no. 75.
15 Dec 65, 60p ATD-65-113
TT 66-61270
Based on Soviet open-sources pub. 1964-65. Rept. on Surveys of Soviet Scientific and Technial Literature, See also AD-466 884.

Descriptors: (*Spacecraft, *Instrumentation), USSR, Magnetometers, Gravity, Meters, Radiation measurement systems, Pressure gages, Photometers, Abstracts, Thermometers, Sounding rockets.

Identifiers: Aerospace research.

This is the second in a series of reports reviewing Soviet developments in aerospace instrumentation. Abstracts contained in the report were selected from Soviet open-source literature made available at the Aerospace Technology Division and the Library of Congress. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 44 abstracts are arranged alphabetically by author within each of the following categories: magnetometer studies, gravity gradient meters, cosmic and corpuscular radiation detection, electromagnetic radiation detection, pressure sensors, and associated studies. A bibliography is presented at the end of the report. (Author)

AD-633 277 Field 14B, 20D
CFSTI Prices: HC$3.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
CHECK CALIBRATION OF THE AEDC 16-FT TRANSONIC TUNNEL.
Technical rept., 5-14 May 65,
by J. A. Gunn. 23 Mar 66, 55p AEDC-TR-66-80
Contract AF 40 (600)-1200
Proj. PB-3642
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Transonic wind tunnels, *Calibration), Tests, Transonic flow.

Tests were conducted in the Propulsion Wind Tunnel, Transonic (16T) of the Propulsion Wind Tunnel Facility to determine the test section Mach number calibration and Mach number distributions. During the test, Mach number was varied from 0.50 to 1.60, and the wall angle from -1.00 to + 1.00 deg, while holding tunnel total pressure at 1000 psfa and tunnel temperature at 120F. At all Mach numbers the region from Station 1 to Station 20 was considered the test region. The results show that the tunnel calibration is a function of test section wall angle, and that all wall angles in the calibrated Mach number range produce Mach number distributions acceptable for testing. This was the first calibration after the installation of the modified main compressor utilizing fiber glass rotor blades. (Author)

AD-633 310 Field 14B, 15E, 9B
CFSTI Prices: HC$4.00 MF$1.00
Lockheed-Georgia Co., Marietta.
A FEASIBILITY STUDY FOR AIRDROP DELIVERY SIMULATOR.
Final rept. 19 Mar 65-18 Feb 66,
by R. G. Smethers, and F. H. Stokes. Mar 66, 128p ER-8091
Contract DA-44-177-AMC-260 (T),
Task 1F121401A254
USAAVLABS TR-66-19

Descriptors: (*Flight simulators, Air drop operations), Feasibility studies, Mathematical models, Simulation, Analog computers, Mathematical analysis, Aerodynamic characteristics, Cargo, Ejection.

Investigations, research, and engineering were performed for the purpose of ascertaining the technical feasibility of a laboratory apparatus capable of simulating the response of an airplane to an airdrop. The airplanes considered encompass those currently in use by the U. S. Army as well as those projected into the 1975 time period. Airdrops by means of aft extraction, gravity drop, and forced downward ejection were included in the analysis. Results led to the conclusion that a simulator is feasible but that no specifically applicable apparatus exists which is capable of performing adequate simulations without considerable modification. The results have indicated those parameters in, and as a result of, an airdrop which must be included in a simulation device. It is additionally concluded that the most practical device which best meets the criteria and system requirements established for a simulator is an analog computer. Although a digital computer could perform as a simulator, it would have the disadvantage of not providing direct reading time histories as would an analog device. Finally, it is concluded that the computer available at USAAVLABS is capable of performing adequate simulations. (Author)

BDX-613-67 Field 14B, 9C
CFSTI Prices: HC$3.00 MF$0.75
Bendix Corp., Kansas City, Mo.
A SINGLE PULSE PEAK READING VOLTMETER.
Master's thesis,
by Anthony F. Schmidt. Feb 65, 77p
Contract AT (29-1)-613
Presented to the University of Kansas.

Descriptors: (*Voltmeters, Tunnel diodes), (*Pulse counters, Voltmeters).

CNLM-5537 Field 14B, 18J
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Aircraft Nuclear Engine Lab.
CONSTRUCTION COMPLETION REPORT-WELDING AND ANNEALING CHAMBER AND CLEAN ROOM-CANEL,
by G. L. Gould, and C. R. Johnson. 24 Feb 64, 39p
Contract AT (30-1)-2789

Descriptors: (*Clean rooms, Construction), (*Refractory metals, Processing).

Identifiers: Canel project.

N66-10424 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
CALIBRATION OF A COMPACT SURVEY PROBE FOR PITOT PRESSURE, MACH NUMBER, AND FLOW ANGULARITY MEASUREMENTS,
by R. B. Blaylock, and W. L. Fox. 15 Mar 65, 15p
JPL-TM-33-179
Contract NAS7-100
NASA CR-67715

Descriptors: *Pitot tube, *Pressure probe.

N66-10605 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Parametrics, Inc., Waltham, Mass.
ULTRASONIC TEMPERATURE MEASURING DEVICE.
Quarterly progress rept. no. 1,
by E. H. Carnevale, S. L. Klaidman, and L. C. Lynnworth.Oct 65, 18p
Contract NAS-3-7981
NASA CR-54780

Descriptors: *Measuring apparatus, *Ultrasonics, *High temperature research, *Room temperature.

N66-15772 Field 14B
CFSTI Prices: HC$2.00 MF$0.50
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
DETERMINATION OF DIAPHRAGM OPENING-TIMES AND USE OF DIAPHRAGM PARTICLE TRAPS IN A HYPERSONIC SHOCK TUBE,
by J. E. Drewry and Z. A. Walenta. Jun 65, 50p
UTIAS-TN-90
Grant NsG-633
NASA CR-69546

Descriptors: *Diaphragm, *Hypersonic shock, *Particle, *Shock tunnel, *Time measurement, *Trapped particle, *Tube, *Trapping.

N66-15784 Field 14B
CFSTI Prices: HC$6.00 MF$1.25
Metrophysics, Inc., Santa Barbara, Calif.
ADVANCED TRANSDUCERS. PHASE A-INVESTIGA- TION OF DIGITAL TRANSDUCERS AND DIGITAL COMPATIBILITY TECHNIQUES.
Nov 65, 237p
Contract NAS8-20515
NASA CR-69543

Descriptors: *Digital transducer, *Analog-to-digital converter.

N66-16025 Field 14B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.
THE HYPERTHERMAL SUPERSONIC AERODYNAMIC TUNNEL,
by H. A. Stine. 1963, 30p NASA-TM-X-50529

Descriptors: *Electric arc, *Hypervelocity wind tunnel, *Supersonic wind tunnel, *Wind tunnel, *High temperature environment.

N66-16748 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A PRESSURE TELEMETER FOR WIND-TUNNEL FREE-FLIGHT PRESSURE MEASUREMENT,
by R. G. Harrison, Jr. 1 Feb 66, 18p JPL-TR-32-763
Contract NAS7-100
NASA CR-70038

Descriptors: *Measuring apparatus, *Pressure measurement, *Scale model, *Free flight, *Hypersonic wind tunnel.

N66-16919 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Parametrics, Inc., Waltham, Mass.
ULTRASONIC TEMPERATURE MEASURING DEVICE.
Quarterly progress rept. no. 2,
by E. H. Carnevale, S. L. Klaidman, and L. C. Lynnworth.Jan 66, 14p
Contract NAS3-7981
NASA CR-54896

Descriptors: *Temperature measurement, *Ultrasonics, *Measuring apparatus, *Molybdenum, *Refractory metal.

N66-17290 Field 14B
CFSTI Prices: HC$2.00 MF$0.50
Southwest Center for Advanced Studies, Dallas, Tex.
MULTIDISCIPLINARY RESEARCH IN SPACE-RELATED SCIENCE AND TECHNOLOGY.
Semiannual rept. period ending 31 Dec 65.
31 Dec 65, 28p
Grant NsG-269-62
NASA CR-70165

Descriptors: *Planet, *Radiophysics, *Ionosphere, *Planetary atmosphere.

N66-18374 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE TUNGSTEN LAMP AS A SECONDARY STANDARD FOR TOTAL RADIANT FLUX,
by E. I. Mohr and M.P. Thekaekara. 1965, 23p
NASA-TM-X-56357

Descriptors: *Spectral emission, *Calibrator, *Flux, *Radiant energy.

PB-169 690 Field 14B, 20E, 7D, 5A
CFSTI Prices: HC$1.25 MF$0.50
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Apr 66, 43p

Descriptors: (*Naval research, Reports), (*Lasers, Glass), (*Gas chromatography, Mass spectroscopy), Chemistry, Metallurgy, Ceramic materials, Optics, Radio equipment, Solid state physics, Landing aids, Cryogenics, Display systems, Pilots, Patents.

Complete papers: Laser Action in Triply Activated Glass; and Rapid Analysis with a Gas Chromatograph- Mass Spectrometer Combination. Summaries are given of research in the following fields: Chemistry, Metallurgy and Ceramics, Optical Physics, Radio, and Solid State Physics. Problem notes, supporting techniques, published reports, papers by NRL Staff members and patents are also included.

AD-465 605 See Field 9B

AD-632 785 See Field 20I

AD-632 790 See Field 4B

AD-632 955 See Field 13H

AD-633 076 See Field 20K

AD-633 087 See Field 8C

AD-633 088 See Field 4B

AD-633 106 See Field 1D

AD-633 107 See Field 1D

AD-633 142 See Field 20M

AD-633 218 See Field 20M

AD-633 252 See Field 18D

AD-633 320 See Field 8N

AD-633 402 See Field 11F

ANL-7123 See Field 7B

LA-3424 See Field 18D

UCRL-14473 See Field 5B

UCRL-16472 See Field 7D

Y-1490 See Field 11F

14C. RECORDING DEVICES

AD-633 358 See Field 17B

14D. RELIABILITY

AD-633 163 Field 14D, 15F
CFSTI Prices: HC$1.00 MF$0.50
Ballastic Research Lab., Aberdeen Proving Ground, Md.
RELIABILITY ESTIMATION FOR MULTI-COMPONENT SYSTEMS.
Memorandum rept.,
by James R. Kniss. Jan 66, 22p MR-1727
Prepared for presentation to the Conference on Design of Experiments (9th) at Redstone Arsenal, Ala.

Descriptors: (*Reliability, Statistical analysis), (*Nuclear warheads, Reliability), Redundant components, Experimental design.

A system for obtaining point estimates and confidence interval estimates for very complex multicomponent systems has been developed. This method was developed specifically to be used to estimate reliabilities of nuclear warheads where the redundancy of circuits and components complicate normal procedures of reliability estimation. However, the system is highly adaptable to any similar situation where access to high speed electronic computers is available. (Author)

AD-633 140 See Field 12A

14E. REPROGRAPHY

AD-269 756 Field 14E
CFSTI Price: HC$7.60
Technical Operations, Inc., Burlington, Mass.
THE PANCHROMATIC SENSITIZATION OF SINGLE CRYSTALS AND EVAPORATED FILMS OF SILVER BROMIDE.
Final rept.,
by Gershon M. Goldberg, John G. Pack, Ann M. McNally, Marianne Schlochauer, and Edward Hartouni. Jan 62, 72p TO-B-61-72
Contract AF 33 (616)-6992
ASD TR-61-732

Descriptors: (*Photographic chemicals, Photosentitivity), (*Silver compounds, Bromides), Single crystals, Films, Dyes, Vapor plating, Photographic images, Spectroscopy, Phthacocyanines, Evaporation.

Identifiers: Silver bromide.

The report concerns an experimental study of methods of achieving the highest possible degree of red sensitization of single crystals and evaporated films of silver bromide. The problem was attacked from several angles. Variations in dye treatment, surface orientation, and surface area all failed to produce a reasonable level of panchromatic sensitization on crystals. It appears that the surface area of crystals is too low to allow sufficient dye pick-up for efficient sensitization. With evaporated films, two approaches were tried: (1) screening of various classes of dyes to determine their relative efficiency for sensitizing these materials, and (2) improvement of the initial sensitivity of evaporated film samples by variation of the evaporation parameters. The latter approach proved to be the better of the two. The dye sensitization of evaporated films having an initial sensitivity of ASA 0.1 when removed from the evaporator produced materials having over-all sensitivities of ASA 2 and red sensitivities (through a Wratten 25 filter) of 0.6. The attainment of these levels of sensitization indicates that one of the primary objectives of the contract, the preparation of a material sensitized to an ASA Exposure Index of 10 (5500K light source) with a Wratten 25 filter factor of not more than 5, is definitely within reach. (Author)

AD-633 236 See Field 11D

AD-633 358 See Field 17B

15A. ANTISUBMARINE WARFARE

AD-632 865 See Field 6E

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-632 869 Field 15B, 19D, 19H
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
PROBLEMS IN THE EMPLOYMENT OF ABC COMBAT AGENTS IN NARROW SEAS,
by Kuzman Smileski. 1966, 7p Translation-1001 TT 66-61257
O Problemima Upotrebe ABH Borbenih Sredstava u Uskim Morima, trans. of Mornaricki Glasnik (Yugoslavia) n2 p190-204 1963.

Descriptors: (*Underwater explosions, Feasibility studies), (*Nuclear bombs, Sea water), (*Biological warfare agents, Sea water), (*Chemical warfare agents, Sea water), Yugoslavia.

The techniques of employing ABC agents at sea, especially those concerning some details, have al-

ready passed into a stage of improvement in which only a few technological deficiencies need to be corrected. These deficiencies are mainly connected with the guidance system; there is also a prevailing tendency towards developing tactical atomic weapons and towards adapting existing ship armament for the use of nuclear charges. The latter development is still in the experimental stage. It is apparent that the development of techniques and uses of ABC agents is moving along the line of finding means, and improving those already existing, for delivering them over great distances. It is also evident, although not much has been said about it, that measures are being taken for developing a state of readiness for protection against the effects of ABC agents. It should be kept in mind also that the use of such agents calls for safety measures which are very important and which must be taken by those who deal with ABC agents.

AD-632 780 See Field 6F

15C. DEFENSE

AD-632 863 **Field 15C, 5D**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
THE FORTY FIFTH ANNIVERSARY OF THE SOVIET ARMY AND NAVY.
1966, 9p Translation-971
TT 66-61260
Trans. of Morskoi Sbornik (USSR) n2 p3-8 1963.

Descriptors: (*Armed forces (Foreign), USSR), (*Army, USSR), (*Navy, USSR), History, Army personnel, Naval personnel.

The fighting men of the Soviet Army and Navy have attained their glorious forty fifth anniversary with a record of great successes achieved in combat and political training. Inspired by the outstanding results obtained by the Soviet people in building Communism, they are applying even more intensively all efforts to carry out the tasks assigned to the Armed Forces by the XXII Congress and the Soviet Communist Party Program. Soviet fighting men, united in close ranks around the Communist Party and its Lenin Central Committee, are ready at any moment to valorously carry out their patriotic and international duty. (Author)

AD-632 865 See Field 6E

AD-632 963 See Field 13A

15D. INTELLIGENCE

AD-619 543 **Field 15D, 5D**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE GERMAN FEDERAL REPUBLIC, THE NEST OF IMPERIALIST ESPIONAGE,
by M. I. Rakhmanov and A. M. Aleshin. 9 Jan 64, 214p Rept. no. FTD-MT-63-258
TT 65-63118
Edited machine trans. of mono. FRG; Genezdo Imperialisticheskogo Shipionazha, Moscow, 1962 p3-184.

Descriptors: (*West Germany, *Military intelligence), Foreign policy, Sabotage, Great Britain, France, United States, East Germany, USSR.

Identifiers: World War II, Intelligence services.

Contents: Criminal past of German intelligence Intelligence services of West Germany in the Services of West German militarism The 'Federal Intelligence Service' (BVD) The 'Department for the Protection of the Constitution' (BVS) Military counterintelligence of the Bundeswehr (MAD) Other espionage-sabotage and undermining centers in the German Federal Republic Union of West German militarism with the reactionary leadership of emigre organizations West Germany--the base of the intelligence services of the USA, England, and France Use of Western Berlin by the intelligence service of the German Federal Republic for espionage-sabotage purposes.

AD-632 925 See Field 18I

AD-633 149 See Field 5K

15E. LOGISTICS

AD-632 992 **Field 15E, 12B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A SYSTEMS APPROACH TO BASE STOCKAGE: ITS DEVELOPMENT AND TEST,
by Harrison S. Campbell, and Talmage L. Jones Jr. May 66, 21p P-3345
Prepared for presentation at National Meeting of the Operations Research Society of America (29th), Santa Monica, California, May 19, 1966.

Descriptors: (*Management planning, *Stock level control), Model tests, Logistics, Spare parts, Air Force, Inventory analysis.

This paper discusses an inventory management proposal described as the 'systems approach to Base Stockage' -- or the base stockage model, for short -- from the standpoint of its development and test at an Air Force installation. The paper is in two parts. First it deals, rather briefly, with the base stockage model itself and then with the design and execution of the test of the model.

AD-632 994 **Field 15E, 12A**
CFSTI Prices: HC$3.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SOME STATISTICAL METHODS FOR MAINTENANCE ANALYSIS,
by Anders Sweetland. Apr 66, 52p RM-4443-PR
Contract AF 49 (638)-1700

Descriptors: (*Statistical analysis, *Maintenance), (*Weapon systems, Maintenance), Analysis of variance, Statistical tests.

A translation of an elementary statistics text into the context of weapon-system analysis. It is designed to supplement the statistical training of maintenance personnel of the Reports and Analysis section at the base level. Most of the examples are from SACR 66-7, but the methods are applicable to data generated by other major Commands. Since most maintenance measures are frequency counts, emphasis is on dealing with this kind of data. Three principal maintenance problems are considered: (1) how alert is affecting the break-rate; (2) what effect the 100-hour periodic is having on subsequent missions; and (3) whether any bomb-nav systems are deteriorating. The answers demonstrate the use of the chi-square test and simple analysis of variance. (Author)

AD-632 801 See Field 15G

AD-633 214 See Field 11F

AD-633 267 See Field 6H

AD-633 310 See Field 14B

15F. NUCLEAR WARFARE

AD-632 999 **Field 15F, 16C, 15G**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
THE EFFECT OF NUCLEAR ARMED MISSILE SYSTEMS ON THE USE OF AIRCRAFT AT SEA,
by V. G. Rog. 1966, 8p Translation-1002
Vliyanie Raketno-Yadernogo Oruzhiya na Primenenie Aviatsii na More, trans. of Morskoi Sbornik (USSR) n6 p31-7 1963.

Descriptors: (*Naval aircraft, *Nuclear weapons), (*Nuclear warfare, *Naval operations), Advanced weapons, Aircraft, Weapon systems, Rockets, Nuclear warheads, Guided missiles, Ships, Vulnerability, Nuclear explosion damage, Military strategy, USSR.

The paper examines the combat possibilities of the aircraft for striking against surface ships and submarines, the methods for detecting the latter, the questions connected with the overcoming of antiaircraft defense, the conducting of an air battle and the control of aircraft in the air.

AD-633 270 **Field 15F, 5D, 15G**
CFSTI Prices: HC$3.00 MF$0.75
RAND Corp., Santa Monica, Calif.
THE RED 'HAWKS' ON THE RATIONALITY OF NUCLEAR WAR.
Memorandum rept.,
by Roman Kolkowicz. Mar 66, 69p RM-4899-PR
Contract AF 49 (638)-1700

Descriptors: (*USSR, *Nuclear warfare), (*Political science, USSR), Poland, Communism, Military organizations, Military strategy, Foreign policy, Threat evaluation.

A consideration of the latest phase in the relations between the military and the Communist Party in the USSR. Under Khrushchev and his successors, the rejection of nuclear war as a political weapon has prevailed. A military spokesman, Lt. Col. E. Rybkin, however, has attacked these views as defeatist and politically dangerous. His opinions, in turn, have been indirectly countered in the Polish press by Prof. J. J. Wiatr. This Memorandum discusses the arguments for both attitudes, and gives observations and conclusions based on them. Both Rybkin's and Wiatr's articles are appended. (Author)

AD-632 836 See Field 15G

AD-633 163 See Field 14D

15G. OPERATIONS, STRATEGY, AND TACTICS

AD-632 801 **Field 15G, 12B, 15E**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Office of Scientific Research, Washington, D. C.
TOWARD A COIN AIRCRAFT ALLOCATION MODEL.
Scientific rept.,
by Joseph P. Martino. 1966, 22p AFOSR-66-0710

Descriptors: (*Air operations, *Mathematical models), (*Counterinsurgency, *Aircraft), Distribution, Operations research, Optimization.

Identifiers: COIN.

The report is based on a presentation made at the 16th Military Operations Research Symposium. It describes a procedure for evaluating the incremental military worth of allocating successive aircraft of the same type to the same mission. If a larger model is available which gives the relative military worth of different missions, the procedure can be used to optimize the allocation of aircraft over all missions. In the absence of the larger model, the procedure can still be used to provide an estimate of the incremental military worth obtained by allocating a given aircraft to any of several missions, or allocating one of several aircraft to given mission. (Author)

AD-632 836 **Field 15G, 15F, 18E**
CFSTI Prices: HC$4.00 MF$1.00
Department of the Navy, Washington, D. C.
THE ATOM AND ARMS,
by D. N. Krasilnikov. 1966, 133p Translation-2072

TT 66-61255
Trans. of mono. Atom i Oruzhie, Moscow 1964.

Descriptors: (*Warfare, Scientific research), (*Nucleary energy, Military requirements), (*Nuclear powered vessels, History), USSR, Nuclear weapons, Antiaircraft defense systems, United States Government, Cermets, Intermetallic compounds, Polymers, Semiconductors, Thermonuclear reactions, Generators, Nuclear power plants, Radioactive batteries, Heat exchangers, Rocket motors, Shock tubes, Ion engines, Plasma engines, Lasers, Cybernetics, Automata, Computers, Aerodynamics, Guided missiles, Spacecraft, Satellites (Artificial), Navigation satellites, Rocket planes, Nuclear reactors, Submarines, Ballistic missile submarines, Shielding, Helicopters, Catamarans, Hydrofoil boats, Gas turbines, Diesel engines, Magnetohydrodynamics, Fuel cells.

Contents (Translations of Sections 1, 2, 3, and 8 of the monograph of the Military Publishing House of the Ministry of Defense of the USSR, Moscow, 1964): Section I, Development of science and its effect on military matters, by P. I. Rusanov and K. P. Stanyukovich. Section II, Key problems in scientifico-technological progress, by L. A. Druzhkin. Section III, Science and rocket-nuclear weapons, by I. I. Anureev. Section VIII, Development of naval forces, by V. P. Demyanov.

AD-633 249 **Field 15G, 1B**
CFSTI Prices: HC$12.50 MF$3.75
Lockheed-Georgia Co., Marietta.
C-141A ENGINEERING FLIGHT TEST RESULTS OF THE AERIAL DELIVERY SYSTEM TESTS,
by J. W. Pieper, and J. W. Hobbs. 11 Feb 66, 603p ER-5473

Descriptors: (*Flight testing, *Air drop operations), (*Jet transport planes, Flight testing, Packaging, Experimental data, Cargo, Ejection, Performance (Engineering), Handling, Cargo parachutes, Loading (Mechanics), Mechanical fasteners, Disconnect fittings.

Identifiers: C-141 aircraft.

Aerial delivery systems tests were accomplished with the C-141A, AF63-8077 (LAC 6008) at the Naval Air Facility, El Centro, California. These tests consisted of personnel delivery drops (dummy drops), extraction line length tests, extraction parachute tow tests, single package cargo drops, and multiple package cargo drops. Qualitative evaluations, airplane response parameters, and airplane loads obtained during these tests are contained in this report. (Author)

AD-632 999 **See Field 15F**

AD-633 270 **See Field 15F**

AD-633 425 **See Field 9B**

16A. MISSILE LAUNCHING AND GROUND SUPPORT

AD-633 264 **Field 16A**
CFSTI Prices: HC$2.00 MF$0.50
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
ROCKET-BLAST-RESISTANT MATERIALS: ROCKET ENGINE BLAST TESTS ON EXPEDIENT SURFACING MATERIALS.
Miscellaneous paper,
by Grady W. Leese. Apr 66, 31p Rept. no. 1, MP-4-804
Proj. 1-V-0-21701-A046,
Task 05

Descriptors. (*Panels (Structural), *Blast), (*Launching sites, *Coatings), Rocket, Surfaces, Ceramic coatings, Aluminum, Steel, Plastics, Nylon, Membranes, Degradation, Heat-resistant materials.

Blasts tests with a 500-lb-thrust rocket engine were conducted on (a) ceramic-coated aluminum blast panels, (b) steel panels, (c) plastic panels, and (d) nylon membrane with and without a heat-resistant coating to determine the capabilities of these items to withstand the high temperatures and velocities generated during the firings. Based on results obtained in this investigation, the following conclusions are believed warranted: (a) The steel panels without protective coating will withstand exposure to higher blast temperatures than will the ceramic-coated aluminum panels. (b) The ceramic coating on the aluminum panels and the heat-resistant coating on the nylon membrane greatly increase the capabilities of these items to resist the rocket engine exhaust blasts. (c) The plastic panels sustained considerable damage during exposure for 20 sec to the full-stage blast of the model engine. (Author)

N66-18336 **Field 16A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
THE AMES 102 - 25.4-88 LIGHT-GAS-GUN MODEL LAUNCHER,
by R. E. Berggren. 1965, 19p NASA-TM-X-56556
Presented at the Meeting of the Aeroballistic Range Assoc. (8th), Santa Barbara, Calif., Apr 28-30, 1965.

Descriptors: *Gas gun, *Gun launching device, *Mechanical system, *Test firing.

AD-632 990 **See Field 5A**

16B. MISSILE TRAJECTORIES

AD-632 844 **See Field 4B**

AD-632 845 **See Field 4B**

AD-632 919 **See Field 4B**

AD-633 166 **See Field 4B**

AD-633 217 **See Field 4B**

AD-633 219 **See Field 4B**

16C. MISSILE WARHEADS AND FUSES

AD-632 999 **See Field 15F**

16D. MISSILES

AD-632 679 **See Field 17G**

17A. ACOUSTIC DETECTION

AD-633 309 **See Field 17B**

17B. COMMUNICATIONS

AD-632 667 **Field 17B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
System Development Corp., Santa Monica, Calif.
MANAGEMENT REPORT: CONTROLLING PRODUCTION OF COMPLEX SOFTWARE.
Technical memo.,
by J. J. Connelly and Y. R. Osajima. 17 May 63, 74p TM-LO-810/101/00
Contract AF 19 (628)-1648

Descriptors: (*Command + control systems, Strategic Air Command), (*Management planning, Command + control systems), Programming (Computers), Production control.

Identifiers: Air force systems 465, L-systems.

Describes the development and production processes of the Planning Subsystem of the Strategic Air Command 465L Systems. Each of the subsystems which compose the 465L System, alone, is in itself a large integrated program system. The 'Planning Subsystem' is comprised of approximately 90 programs, 300,000 machine instructions and a data base of 6,000,000 words. This paper which was originally presented as a briefing is restricted to a definition of the basic functions of the production process. It includes 32 illustrations to clarify the text. (Athor)

AD-632 855 **Field 17B, 9C**
CFSTI Prices: HC$3.00 MF$0.75
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
EXPERIMENTAL RESULTS OF PSEUDO-RANDOM DOT SCAN.
Final rept. (phase 2), 15 Oct 63-30 Nov 65,
by S. Deutsch, P. Balaban, and A. Atzmon. Jan 66, 81p PIBMRI-1308-66
Contract AF 19 (628)-3815,
Proj. AF-4610,
Task 461007
AFCRL 66-130
See also AD-616 275.

Descriptors: (*Pseudo-random systems, *Television display systems), (*Electron optics, Pseudo-random systems), (*Information theory, Television display systems), Television equipment, Narrowband, Scanning, Radio relay systems, Phosphorescent materials, Visual acuity, Experimental data.

The experimental results for five different pseudo-random dot scan television systems are given. The system bandwidths are 1 mc/sec, 62 kc/sec, 8 kc/sec, 2 kc/sec, and 240 cps. (Author)

AD-632 917 **Field 17B, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Institute for Defense Analyses, Arlington, Va. Research and Engineering Support Div.
ON NORMAL APPROXIMATIONS TO THE ERROR Probability for a correlation receiver in a hard-LIMITED CHANNEL.
Research paper,
by J. M. Aein. Jan 66, 44p Rept. nos. RP-P-241, IDA/HQ-66-4565
Contract SD-50,
Task T-10

Descriptors: (*Correlators, *Communication satellites (Active)), (*Approximation (Mathematics), Errors), Probability, Mathematical models.

Identifiers: Repeaters (Transmission systems).

The advent of communication satellites has stimulated interest in signal designs allowing access to a repeater by many independent carriers. To maximize the power efficiency of the satellite, consideration has been given to the use of a repeater which can be characterized as a hard-limited channel. A technique for achieving multiple access to a hard-limited channel is to use constant-envelope, pseudo-noise phase-coded spread-spectrum carriers (p-n carriers) with correlation-type receivers. The interferring signals at the limiter input are modeled as a statistically independent zero mean stationary Gaussian noise process. This paper examines the approximation to Normal of the error probability when binary symmetric bit-to-bit independent message sources are received by a coherent stored reference correlator after passing through a hard-limited channel. The approach used here follows that of Shannon and Gallagher for computing the probability tail with Chernoff bounding techniques. This method avoids the usual objections raised to the Edgeworth series when used to compute an error probability. Subject to restrictions of weak carrier-to-noise ratios at the channel input and error rates less than

10 to the -2, the conclusion reached is that the error probability can be computed, to within the accuracy of the mathematical idealization of a real channel, as if the correlator output were Normal. (Author)

AD-633 309 **Field 17B, 17A**
CFSTI Prices: HC$5.00 MF$1.00
Technische Hochschule, Vienna (Austria). Institut fuer Niederfrequenztechnik.
SPEECH QUALITY MEASUREMENTS.
Annual summary scientific rept.,
by E. H. Rothauser, and G. E. Urbanek. 31 Dec 65, 157p
Contract AF 61 (052)-856
AFCRL 66-170

Descriptors: (*Speech, Measurement), (*Voice communication systems, Scientific research), Sound signals, Sound transmission, Psychoacoustics, Intelligibility, Test methods, Hearing, Statistical methods, Test methods, Programming (Computers), Signal-to-noise ratio, Austria.

Identifiers: Voc.

This paper is concerned with studies being conducted on a modified isopreference method for rating speech communication systems in view of speech quality. The concept of speech quality is studied by subjective measurements in terms of intelligibility and 'preference'. Listening experiments using the forced pair comparison technique have been performed with trained and untrained groups of listeners. Various kinds of speech signals from different systems have been compared with three idealized reference signals using noise in additive and multiplicative form as degradation signals. Different kinds of tests for preference, intelligibility, rank ordering and loudness are reported which were utilized to study several aspects of speech quality. (Author)

AD-633 358 **Field 17B, 14C, 14E, 11I**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Oklahoma City, Okla. Military Communications Dept.
MATRIX CONTROLLED DISPLAY DEVICE. PHASE II.
Final engineering rept., 5 Jan 65-5 Mar 66.
25 May 66, 94p
Contract NObsr-89334,
Proj. SR-080301,
Task 9475

Descriptors: (*Display systems, Optical equipment), (*Information retrieval, Display systems), Thermoplastics, Electrodes, Films, Recording systems.

Identifiers: TIRP technique.

The report describes progress to develop a matrix display with 2000 x 2000 discrete elements on a 10 x 10 foot screen by using in-air thermoplastic recording and TIRP (Total Internal Projection Prism) projection techniques. A feasibility model was constructed which provides a 25 x 25 elemental portion of the full-scale display by the optical readout of deformations on a thin film of thermoplastic. Information is recorded on the thermoplastic by the coincident switching of crossed-grid electrodes on 2-mil centers. Tests show that the in-air recording process inherently provides a nonlinearity at each non-addressed cell to prevent its partial excitation when addressed cells are written. The present recording resolution of 500 elements per linear inch provides information storage at a density of 250,000 discrete elements per square inch. At ambient, the information is permanently stored. Storage time decreases with increasing thermoplastic temperature to under a second at 100C. Fabrication of a 2000 x 2000 matrix for the full-scale display was initiated. Initial results using KPR as an evaporation resist to directly form the indium oxide electrodes indicate that a 2000 x 2000 matrix with very few, if any, defects can be fabricated. (Author)

N66-10343 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
GEOMETRIC ASPECTS OF GROUND STATION/SATELLITE COMMUNICATIONS,
by R. D. Bourke. 15 Oct 65, 17p JPL-TR-32-820
Contract NAS7-100
NASA CR-67717

Descriptors: *Elliptical orbit, *Communication, *Geometry, *Ground station, *Satellite.

N66-10421 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LARGE ANTENNA APERTURES AND ARRAYS FOR DEEP SPACE COMMUNICATIONS,
by A. C. Ludwig, W. D. Merrick, and P. D. Potter.1 Nov 65, 31p JPL-TR-32-848
Contract NAS7-100
NASA CR-67666

Descriptors: *Deep space, *Spacecraft communications system, *Antenna array, *Frequency control, *Ground station.

N66-16053 **Field 17B**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SIGNIFICANT ELECTRONIC APPLICATIONS AND EXPERIMENTAL RESULTS FROM PROJECT ECHO,
by H. L. Eaker. Nov 65, 102p NASA-TM-X-55365, X-733-65-448
Presented at Wescon/65, San Francisco, Aug 24-27 1965.

Descriptors: *Beacon, *Communication system, *Echo II satellite, *Ground test, *Television transmission.

N66-18372 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SYSTEM REQUIREMENTS FOR A DIRECT R.F. TO R.F. RE-ENTRANT TRAVELING WAVE TUBE COMMUNICATIONS SATELLITE TRANSPONDER,
by L. J. Ippolito. 1965, 30p NASA-TM-X-56546
Presented to the Satellite Commun. Session, Intern. Space Electron. Symp., Miami Beach, Fla., Nov 2-4, 1965.

Descriptors: *Communications satellite, *Transponder, *Traveling wave tube, *Frequency converter.

N66-18393 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
TRACKING, COMMAND, CONTROL AND DATA ACQUISITION OF NASA FLIGHT PROGRAMS,
by H. L. Hoff. 1965, 27p NASA-TM-X-56085
Presented at the N. Y. Acad. of Sci. Conf. on civilian and military uses of Aerospace, New York, 14 Jan 1965.

Descriptors: *Data acquisition, *NASA program, *Space program, *Telemetry, *Tracking.

TID-21380 **Field 17B, 20I, 20N**
CFSTI Prices: HC$6.00 MF$1.25
Research Lab. of Electronics, Massachusetts Inst. of Tech., Cambridge.
QUARTERLY PROGRESS REPORT NO. 75,
by H. J. Zimmermann, and G. G. Harvey. 15 Oct 64, 240p
Contract AT (30-1)-1842

Descriptors: (*Plasma physics, Communication systems), (*Communication systems, Electromagnetic waves).

AD-632 735 **See Field 5J**

AD-633 144 **See Field 9D**

AD-633 428 **See Field 20N**

17G. NAVIGATION AND GUIDANCE

AD-632 679 **Field 17G, 22B, 1C, 16D**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
AN ATTITUDE DETERMINING SYSTEM FOR SPINNING ROCKETS,
by Joseph M. Conley and R. B. Patton, Jr. Dec 65, 50p BRL-R-1291
Proj. 1V014501B53A

Descriptors: (*Attitude control systems, *Sounding rockets), (*Magnetometers, Attitude control systems), (*Solar cells, Attitude control systems), Digital computers, Navigation computers, Magnetic guidance.

An attitude sensor for spinning rockets and the associated digital computing procedure have been developed and tested. The measuring system consists of a commercially available flux gate magnetometer and a single solar cell with a fan-shaped acceptance beam. The computing procedure is designed to improve approximations of the rocket aspect angles by successive differential corrections which are derived by a least squares treatment of an overdetermined system of condition equations. Both the measuring system and the computing methods have been found to provide a practical approach for determining rocket aspect. The system is estimated to have been accurate to between one and two degrees in its initial test and to have a potential accuracy of better than one degree. (Author)

AD-632 847 **Field 17G, 10B**
CFSTI Prices: HC$2.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
DEVELOPMENT OF A THERMOELECTRIC GENERATOR-POWERED SOLID-STATE 100-WATT BEACON SYSTEM.
Research and development rept. (Final),
by Donald B. Steen. Apr 66, 37p MEL-83/66
Proj. S-F013-06-01,
Task 9610

Descriptors: (*Beacon lights, Power supplies), (*Thermoelectricity, Beacon lights), Navigational aids, Solid state physics, Design, Economics.

A solid-state 100-watt navigational beacon power system employing a propane-fired, 30-watt, thermoelectric power supply, a capacitor energy storage bank; and a 5-second, one-quarter duty cycle, solid-state flasher has been developed for possible replacement of present Coast Guard battery-powered systems using mechanical flashers. System development began with determining the electrical characteristics and performance of the thermoelectric power supply in severe ocean environments. The power supply was modified to increase its reliability and wind resistance. The system meets the environmental and reliability specifications required for buoy operation. The MEL thermoelectric generator-powered beacon system is technically and economically superior to battery-powered, mechanically flashed systems, and the many advantages of solid-state apparatus should be exploited for Coast Guard use. A cost comparison was

made with an advanced power system using air depolarized batteries and a sun switch to extend the buoy service period to the same 1-year service period required to refuel the thermoelectric generator. The comparison showed that the estimated 10-year procurement costs of $12,200 for the battery system could be reduced to only $1,600 by use of the MEL thermoelectric generator-powered system. (Author)

N66-15777 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
RAND Corp., Santa Monica, Calif.
NAVIGATION BY SATELLITE USING TWO-WAY RANGE AND DOPPLER DATA,
by J. H. Hutcheson, J. D. Mallett, and H. S.Schwimmer. Dec 65, 79p RM-4815-NASA
Contract NASr-21
NASA CR-69552

Descriptors: *Doppler effect, *Navigation system, *Range and range rate tracking, *Satellite navigation system.

PB-169 376 **Field 17G**
CFSTI Prices: HC$2.00 MF$0.50
Systems Research and Development Service, Federal Aviation Agency, Washington, D. C.
ELAPSED TIME AS A MEASURE OF NAS TERMINAL PERFORMANCE FEASIBILITY STUDY, PHILADELPHIA-RICHMOND.
Interim rept.,
by Donald L. Dunlap and Stanley H. Gaffen. Dec 65, 49p RD-65-138
Proj. FA-141-411-01A

Descriptors: (*Flight, Time studies), Performance (Engineering), Feasibility studies.

This study investigates the feasibility of quantifying terminal area delay from the measurement of departure and arrival elapsed times. Elapsed time data were obtained on all fixed wing itinerant flights occurring at Philadelphia International Airport, Philadelphia, Pa., and Byrd Field, Richmond, Va., during a 10 day period in May. The report describes the behavior of the elapsed time data obtained, discusses the use of elapsed time data as a measure of NAS terminal performance, and makes some recommendations regarding the initiation of a national terminal performance measurement system. (Author)

AD-633 034 **See Field 22C**

17I. RADAR DETECTION

AD-632 915 **Field 17I, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Institute for Defense Analyses, Arlington, Va. Research and Engineering Support Div.
RADAR RETURN FROM VEHICLES IN THE IONOSPHERE.
Research paper,
by S. Rand and F. Albini. Nov 65, 35p Rept. nos. RP-P-225, IDA/HQ-65-4474
Contract SD-50
Prepared for presentation at the Symposium of the American Astronautical Society (2nd) on 'Interactions of Space Vehicles with an Ionized Atmosphere' at Miami, Florida, September 26, and 27, under title of 'Radar Cross Section of an Ionospheric Satellite'.

Descriptors: (*Satellite tracking systems, *Ionization trails), (*Radar echo areas, Ionization trails), Spacecraft, Trajectories, Ionosphere, Ionization, Radar tracking, Backscattering, Spectrum signatures.

Approximate expressions are derived for radar (backscatter) cross sections of the wakes of vehicles in the ionosphere. Vehicle speed is assumed to be much greater than ion thermal speed but much less than electron thermal speed. It is shown that, under broadside incidence conditions, the large region of mild electron depletion behind the vehicle can give rise to backscatter cross sections approaching 100 square meters. The orientation of the velocity vector with respect to the local geomagnetic field is also shown to be important. (Author)

AD-632 997 **Field 17I, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
AMPLITUDE ANALYSIS PROGRAM.
Technical note,
by Florence Wilson. 29 Apr 66, 59p TN-1966-1
Contract AF 19 (628)-5167, ARPA Order-600
ESD TR-66-198

Descriptors: (*Radar tracking, *Data processing systems), Pulse analyzers, Radar echo areas, Frequency, Distribution, Photographic recording systems, Film readers, Analog-to-digital converters, Digital computers, Programming (Computers), Compilers, Frequency analyzers.

Identifiers: Amplitude analysis program, IBM7094, Fortran.

The Amplitude Analysis Programs were written to produce an average pulse shape over a reasonable time interval for up to 200 range stations behind the tracked target leading edge and a frequency distribution of cross section at each station over the time period. The final output is presented as Stromberg-Carlson 4020 plots of average pulse and distributions. The input is obtained by digitizing A-Scope films on the Group 21 High Precision computer controlled film reader, filtering this data with a ramp filter to locate the position of the tracked target leading edge, and then writing a tape containing only that data behind the leading edge. The Amplitude Frequency Distribution and Statistical Program uses this filtered output tape and computes an average pulse and the standard deviation from this pulse at each desired range station over a given time interval and also finds the distribution of cross section at each range station, if desired. A tape containing this information is then used as input to the Amplitude Plotting Program which produces the Stromberg-Carlson 4020 plots. The present report contains a summary of the method of obtaining the input data, the mathematics involved, a description and listing of the two programs, and directions for running the programs. (Author)

AD-633 036 **Field 17I, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
REACTIVE-WALL REFLECTORS FOR 9 MM MICROWAVE OPERATION.
Final engineering rept., 6 Jan 65-6 Jan 66. 6 Jan 66, 13p Rept. no. 1968-3
Contract NOw-65-0329-d
See also AD-623 371.

Descriptors: (*Radar corner reflectors, Optimization), Polarization, Radar echo areas, Radar reflections, Backscattering, Electromagnetic waves, Dielectrics, Programming (Computers).

The accomplishments of a research program on reactive-wall corner reflectors are summarized. The use of a reactive wall on one face of a trihedral reflector to provide same-sense circular polarization response was investigated. Two corner reflector models were tested and found to perform as expected. Computer programs were developed to provide for efficient computation of the CP response of reactive-wall designs and to provide for computer optimization of reactive wall designs. Three computer-optimized designs were found to have near-maximum response over the appropriate range of incidence angles. (Author)

AD-633 054 **Field 17I, 22C**
CFSTI Prices: HC$1.00 MF$0.50
Mitre Corp., Bedford, Mass.
THE RELATIVE MOTION BETWEEN A RADAR AND A SATELLITE OBJECT,
by S. H. Bickel. May 66, 24p MTR-67
Contract AF 19 (628)-5165,
Proj. AF-4966
ESD TR-66-87

Descriptors: (*Radar tracking, *Satellites (Artificial)), Motion, Simulation, Algebra, Vector analysis.

The relative motion between an earth-based radar and a satellite object is of interest for radar-tracking studies, signature simulation studies, and for developing inverse scattering techniques. Here, the motion analysis is accomplished with elementary vector algebra. This approach results in considerable simplification of the final equations and relationships. (Author)

AD-633 351 **Field 17I, 9D, 20N**
CFSTI Prices: HC$6.00 MF$1.25
Columbia Univ., New York. Electronics Research Labs.
DETECTABILITY OF RADAR ECHOES IN NOISE AND CLUTTER INTERFERENCE.
Technical rept.,
by C. Pedersen. 30 Sep 65, 261p T-2/318, CU-28-65-AF-1478-ERL
Contract AF 49 (638)-1478, ARPA Order-279

Descriptors: (*Radar echo areas, Radar clutter), (*Radar clutter, Information theory), (*Information theory, Radar echo areas), (*Noise (Radar), Information theory), Signal-to-noise ratio, Radar interference, Mathematical analysis, Moving target indicators, Radar tracking, Data processing systems.

The radar echo from a moving, non-scintillating point target is assumed to be received in the presence of noise and clutter interference. For best detection of the echo, the radar receiver will include a data processor which maximizes the signal-to-interference power ratio at its output. This report presents the integral equation which determines the weighting function of the optimum data processor. Several general forms of solution are also presented, along with specialized forms of solution which are applicable for appropriately simplified sources of clutter. These solutions show that the optimum processor has no simple relation to either the transmitted waveform or to the clutter dispersion function but, rather is markedly influenced by the relative power levels of the noise and clutter components of the interference. Ultimately, the extent to which clutter can be rejected by a suitably designed signal processor will be limited by the (often neglected) noise level which accompanies the clutter. (Author)

N66-10417 **Field 17I**
CFSTI Prices: HC$4.00 MF$1.00
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE RANGER III FLIGHT PATH AND ITS DETERMINATION FROM DATA,
by W. L. Sjogren. 15 Sep 65, 133p JPL-TR-32-563
Contract NAS7-100
NASA CR-67698

Descriptors: *Tracking, *Flight path, *Ranger III Lunar probe.

N66-16140 **Field 17I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RADAR TRACKING SHIP PERFORMANCE DURING MA-8,
by E. A. Ross. 30 Oct 62, 50p NASA-TM-X-55357, X-551-62-198

Descriptors: *Mercury (Ma-8) flight, *Ground support system, *Ship.

N66-16141 **Field 17I**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RADAR TRACKING SHIP PERFORMANCE DURING MA-9,
by J. Barsky, W.C. Bryant, and E. A. Ross. 31 Jul 63, 69p NASA-TM-X-55358, X-554-63-161

Descriptors: *Faith 7, *Manned space flight, *Radar tracking, *Mercury (ma-9)flight, *Reentry.

17J. SEISMIC DETECTION

AD-632 956 **See Field 8K**

AD-632 957 **See Field 8K**

18B. ISOTOPES

IDO-14669 **Field 18B, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
URANIUM RECOVERY FROM ALUMINUM ALLOYED FUEL ICPP RUN NO. 21,
by B. R. Wheeler, G. F. Offutt, and R. E. Commander.Jan 66, 35p
Contract AT (10-1)-205

Descriptors: (*Reactor fuels, Uranium), (*Uranium, Recovery).

K-1469 **Field 18B**
CFSTI Prices: HC$4.00 MF$1.00
Oak Ridge Gaseous Diffusion Plant, Tenn.
THERMAL DIFFUSION COLUMN SHAPE FACTORS. PART I. SHAPE FACTORS BASED ON AN INVERSE POWER REPULSION MODEL,
by E. Greene, R. L. Hoglund, and E. Von Halle.7 Feb 66, 177p
Contract W-7405-eng-26

Descriptors: (*Thermal column, Gases), (*Gases, Thermal diffusion separation).

MND-3180-1 **Field 18B, 20A**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
A RADIOISOTOPE-POWERED UNDERWATER ACOUSTIC BEACON. PHASE I.
Final rept. (Feasibility study),
by Marvin P. Norvin. Jan 65, 69p MND-3180-1
Contract AT (30-1)-3180

Descriptors: (*Underwater sound signals, Nuclear industrial applications), (*Radioactive isotopes, Energy conversion).

TEI-855 **Field 18B, 10A**
CFSTI Prices: HC$1.00 MF$0.50
Geological Survey, Washington, D. C.
MEASUREMENT OF TURBINE DISCHARGE WITH RADIOISOTOPES,
by Bernard J. Frederick. Oct 64, 36p TEI-855

Descriptors: (*Radioactive isotopes, Nuclear industrial applications), (*Turbines, Energy conversion).

BMI-1753 **See Field 7E**

BNL-7859 **See Field 6R**

K-P-3248 **See Field 18J**

N66-15502 **See Field 18H**

18C. NUCLEAR EXPLOSIONS

AD-632 805 **Field 18C, 9B**
CFSTI Prices: HC$3.00 MF$0.75
MRD Div., General American Transportation Corp., Niles, Ill.
DESIGN PROCEDURES FOR SHOCK ISOLATION SYSTEMS OF UNDERGROUND PROTECTIVE STRUCTURES. VOLUME V. RESPONSE SPECTRA OF MULTI-DEGREE-OF-FREEDOM ELASTIC SYSTEMS. SUPPLEMENT. A COMPUTER PROGRAM FOR THE COMPUTATION OF DYNAMIC STRUCTURAL RESPONSE.
Technical documentary rept. for Nov 63-Jan 65,
by N. M. Newmark, W. H. Walker, and R. J. Mosborg.Apr 66, 79p
Contract AF 29 (601)-6253,
Proj. AF-5710
RTD TDR-63-3096-Vol-5-Suppl
Subcontracted to Newmark, Hanson and Associates, Urbana, Ill.

Descriptors: (*Underground structures, Detonation waves), (*Detonation waves, Nuclear explosions), (*Programming (Computers), Detonation waves), (*Vibration isolators, Detonation waves), Equations of motion, Integration, Tables, Shock (Mechanics), Beams (Structural).

The supplement (to AD-627 516) contains a description of the computer program developed to study the dynamic response of multi-degree-of-freedom systems subjected to earthquake or blast-type ground motions. A description of the features and a derivation of the equations solved by the computer program are presented. The data input to the computer is defined by using a control card containing or preceding each type of input information. The purpose of each control card and the data is given with an example of some typical problems solved using the program. The final section contains the flow diagrams of the main program and each subroutine. (Author)

UCRL-14463 (Rev.1) **Field 18C**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
FREE FIELD MOTION NEAR A NUCLEAR EXPLOSION IN SALT: PROJECT SALMON,
by Leo A. Rogers. 1 Feb 66, 36p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Rock salt), (*Rock salt, Underground explosions).

Identifiers: Salmon project.

18D. NUCLEAR INSTRUMENTATION

AD-633 252 **Field 18D, 20H, 14B**
CFSTI Prices: HC$5.00 MF$1.00
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
NEUTRON AND GAMMA-RAY SPECTROSCOPY AND ACTIVATION ANALYSIS.
Final rept. 1 Jan 61-1 Jan 66,
by Norman C. Rasmussen, and Theos J. Thompson.
Feb 66, 179p MITNE-70
Contract AF 19 (604)-7492,
Proj. AF-5620,
Task 562002
AFCRL 66-135
Continuation of Contract AF 19 (604)-3461.

Descriptors: (*Gamma-ray spectroscopy, Instrumentation), (*Nuclear spectroscopy, Neutrons), (*Neutron spectrum, Measurement), (*Radioactivation analysis, Instrumentation), Semiconductor devices, Germanium, Lithium, Nuclear radiation spectrometers, Neutron capture gamma rays, Scintillation counters, Nuclear energy levels, Reactor fuel elements, Non-destructive testing, Fast neutrons, Dosimetry, Boron, Neutron activation.

The objectives of this contract were to carry out basic research in the areas of neutron spectroscopy and dosimetry, gamma-ray spectroscopy and dosimetry, and activation analysis techniques. Early work in gamma-ray spectroscopy was done mostly with the bent crystal spectrometers and the triple coincidence scintillation spectrometer which were used in capture gamma-ray studies. Later, however, all the work in gamma-ray spectroscopy was in the development and application of lithium drifted Ge (Li) solid state detectors. A description is included of the fabrication techniques used and the application of these detectors to the study of capture gamma-rays and spent reactor fuel. Work on problems of neutron spectroscopy and dosimetry are described. This work resulted in an improved method for measuring fast neutron spectra through the use of foils. The work done in activation analysis is summarized.

ANL-7078 **Field 18D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
CORRECTIONS FOR X-RAY INTENSITY DATA OBTAINED FROM ELECTRON MICROPROBES,
by Raymond K. Hart. Nov 65, 12p
Contract W-31-109-eng-38

Descriptors: (*Chemical analysis, Probes (Electro magnetic)), (*Radiation measurement systems, Corrections).

CONF-799-12 **Field 18D, 18H**
CFSTI Prices: HC$1.00 MF$0.50
Edgerton, Germoshausen and Grier, Inc., Santa Barbara, Calif.
APPARATUS FOR PRECISE MEASUREMENT OF SCINTILLATOR DECAY TIMES,
by R. L. McGuire, E. C. Yates, D. G. Crandall, andC. R. Hatcher. Oct 64, 8p Conf-64-225-18
Contract AT (29-1)-1183
Presented at Annual Nuclear Science Symposium (11th), Philadelphia, Oct. 1964.

Descriptors: (*Radioactive decay, Radiation measurement systems), (*Scintillation counters, Radioactive decay).

DP-944 **Field 18D, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Memours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
DESCRIPTION OF A TEMPERATURE MONITOR FOR LARGE REACTORS. PART III. PERFORMANCE,
by Joseph S. Byrd, Arthur H. Dexter, Malcolm H. Goosey,C. R. Hutter, and R. W. Leep. Jan 65, 32p
Contract AT (07-2)-1

Descriptors: (*Temperature warning systems, Nuclear reactors), (*Temperature control, Monitors).

K-L-6021 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge Gaseous Diffusion Plant, Tenn.
TEST AND ADJUSTMENT PROCEDURE MANUAL. FIXED FILTER PAPER ALPHA AIR MONITOR-MODEL A (KK-1589),
by G. B. Seaborn. 26 Jan 65, 26p
Contract W-7405-eng-26

Descriptors: (*Radiation monitors, Instruction manuals), (*Capacitors, Radiation measurement systems).

LA-3424 **Field 18D, 14B, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A COMPARISON OF DIFFERENT METHODS OF PARTICLE SIZE ANALYSIS,
by A. L. Hipp. Sep 65, 27p
Contract W-7405-eng-36

Descriptors: (*Powder metals, Particle size), (*Particle size, Powder metallurgy).

LA-3431 **Field 18D, 18I, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
QUARTERLY STATUS REPORT ON ADVANCED REACTOR TECHNOLOGY (ART) FOR PERIOD ENDING OCTOBER 31, 1965.
Nov 65, 65p
Contract W-7405-eng-36

Descriptors: (*Fast reactors, Reactor system components), (*Reactor fuel elements, Reactor cores).

MURA-716 **Field 18D, 20G**
CFSTI Prices: HC$1.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
HIGH SPEED DIGITAL DYNAMIC FIELD MEASURING SYSTEM,
by G. E. Bush. 31 Aug 65, 19p
Contract W-31-109-38-1707

Descriptors: (*Particle accelerators, Analog-to-digital converters), (*Analog-to-digital converters, Control sequences).

NYO-3246-3 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
PROTON AND ELECTRON IRRADIATIONS OF CONTOURED SEMICONDUCTOR RADIATION DETECTORS,
by J. B. Trice, G. C. Huth, and H. E. Bergeson. 1964, 45p
Contract AT (30-1)-3308

Descriptors: (*Radiation measurement systems, Semiconductors), (*Charged particles, Radiation measurement systems).

NYO-3246-4 **Field 18D**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
STUDY OF SURFACE CONTOURING AS APPLIED TO SEMICONDUCTOR RADIATION DETECTORS.
Semiannual rept., Jun 64-Jan 65,
by Gerald C. Huth, James B. Trice, and Robert J.Locker. 1965, 63p
Contract AT (30-1)-3246

Descriptors: (*Charged particles, Radiation measurement systems), (*Radiation measurement systems, Semiconductor devices).

N66-18123 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Nuclear Research, Warsaw (Poland).
SILICONE LITHIUM DRIFTED DETECTORS,
by A. Kuchcinski. Apr 65, 32p INR-621 (XV)I

Descriptors: *Drift, *Silicone, *Lithium, *Radiation detector, *Semiconductor device.

RFP-668 **Field 18D, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
AN AUTOMATIC RECORDING, LOW-TEMPERATURE DILATOMETER,
by R. R. McDonald, R. J. Pinkney. 1 Feb 66, 7p
Contract AT (29-1)-1106

Descriptors: (*Dilatometers, Low temperature alloys), (*Recording systems, Automatic).

RFP-673 **Field 18D, 20F**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
OPTICAL DETERMINATION OF DEPTH OF DEFECTS BY REPLICATION TECHNIQUES,
by D. V. Miley, and V. K. Grotzky. 14 Jan 66, 7p
Contract AT (29-1)-1106

Descriptors: (*Defects (Materials), Optical analysis), (*Optical instruments, Defects (Materials)).

Identifiers: Replication techniques.

SLAC-53 **Field 18D, 20G, 20H**
CFSTI Prices: HC$4.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
TWO-MILE ACCELERATOR PROJECT.
Quarterly status rept. 1 Jul-30 Sep 65.
Nov 65, 100p
Contract AT (04-3)-400

Descriptors: (*Linear accelerators, Construction), (*Electron beams, Particle accelerators).

Y-1503 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
HIGH-VOLUME, AIR-MONITOR CALIBRATION FACILITY,
by Merwyn Sanders, and P. C. McRee. 9 Feb 66, 9p
Contract W-7405-eng-26

Descriptors: (*Health physics instrumentation, Monitors), (*Monitors, Calibration).

IDO-17112 **See Field 18H**

LA-3435 **See Field 6R**

NYO-3276-8 **See Field 18H**

NYO-3276-9 **See Field 18H**

ORNL-3889 **See Field 7A**

PB-169 539 **See Field 20H**

PB-169 540 **See Field 20H**

18E. NUCLEAR POWER PLANTS

ACNP-64611 **Field 18E**
CFSTI Prices: HC$3.00 MF$0.75
Allis-Chalmers Mfg. Co., Atomic Energy Div., Bethesda, Md.
ELK RIVER REACTOR OPERATIONS ANALYSIS PROGRAM.
Annual progress rept., 1 Jul 63-30 Jun 64,
by M. N. Audi, J. R. Fisher, C. Ho, and A. C. Schafer Jr. 30 Jun 64, 92p
Contract AT (11-1)-1357

Descriptors: (*Reactor operation, Nuclear power plants), (*Reactor system components, Reactor operation).

AD-632 868 **Field 18E, 21F, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Department of the Navy, Washington, D. C.
THE ATOM ENGINE.
by A. M. Anzine. 1966, 69p Translation-2125
TT 66-61258
Trans. of mono. Atom-Dvigatel, Moscow 1964.

Descriptors: (*Nuclear industrial applications, USSR), (*Nuclear power plants, State-of-the-art reviews), (*Aircraft nuclear propulsion, State-of-the-art reviews), (*Marine nuclear propulsion, State-of-the -art reviews), (*Spacecraft nuclear propulsion, State -of-the-art reviews), Nuclear engineering, Nuclear physics.

This brochure describes atomic engines of electric stations, submarines, surface ships, aircraft and rockets. It discusses the fields in which atomic energy plants are currently being used and the prospects for their application. (Author)

BAW-1280-18 **Field 18E, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Babcock and Wilcox Co., Alliance, Ohio. Research Center.
SECOND PROGRESS REPORT ON THE MODEL SODIUM HEATED STEAM GENERATOR. RESEARCH REPORT NO. 5455,
by D. W. Koch. 31 Dec 64, 20p
Contract AT (11-1)-1280

Descriptors: (*Nuclear power plants, Reactor materials), (*Nuclear reactors, Simulation).

ORNL-P-1182 **Field 18E, 18I**
CFSTI Prices: HC$1.00 MF$0.50
North Carolina State Univ. of Raleigh.
AN ANALYSIS OF FISSION PRODUCT DEPOSITION AND CORRELATION WITH EXPERIMENTS,
by M. N. Ozisik, and F. H. Neill. 1964, 23p
Contract W-7405-eng-26
CONF 650 407-1
Prepared for presentation at International Symposium on Fission Product Release and Transport Under Accident conditions, Oak Ridge, Tenn.

Descriptors: (*Fission products, Reactor coolants), (*Reactor coolants, Gas-cooled reactors).

AD-632 836 **See Field 15G**

18F. RADIATION SHIELDING AND PROTECTION

AD-632 989 **Field 18F, 13F**
CFSTI Prices: HC$3.00 MF$0.75
Army Nuclear Defense Lab., Edgewood Arsenal, Md.
DECONTAMINATION OF LAND TARGETS, VEHICLES, AND EQUIPMENT,
by J. C. Maloney, and J. L. Meredith. May 66, 74p
NDL-TR-66
Proj. Y-F011-05-01-202

Descriptors: (*Radiological contamination, Decontamination), (*Railroad tracks, Decontamination), (*Vehicles, Decontamination), (*Targets, Decontamination), Effectiveness, Nuclear warfare, Recovery, Soils, Simulation, Cargo vehicles.

The objective of this project is to develop and test radiological countermeasures that can be used in post-nuclear-attack recovery operations. The specific objective of this phase of the project was to conduct decontamination experiments on exterior surfaces made radioactive with small-particle simulant, and to conduct decontamination studies on railroad tracks, transportation vehicles, and mechanical equipment used for radiological recovery operations. The following conclusions were based on the results of these studies: (1) Hosing and sweeping reclamation techniques when applied to 20- to 75-micron fallout on land targets are less effective than when applied to larger particle ranges. (2) The reclamation techniques of air and water hosing are of limited effectiveness when applied to railroad track areas. The passage of fast trains can be expected to effectively remove fallout from the track area under the train. (3) Vehicles and equipment contaminated with fallout should be decontaminated to reduce a significant potential dose from such contamination. They are effectively decontaminated by dry manual and air-hosing procedures, and in some cases, by weathering effects. First-echelon effort with a broom is adequate and reasonable. (4) The presence or use of water, especially in below-freezing weather, can adversely affect the decontamination of vehicles and equipment. (Author)

AD-633 216 **Field 18F**
CFSTI Prices: HC$4.00 MF$1.00
Ballistic Research Labs., Aberdeen Proving Ground, Md.
SECONDARY GAMMA RAY TRANSMISSION THROUGH PLANE SLABS OF CONCRETE,
by Alfred J. Budka, and Thomas J. Dolce. Sep 65, 131p BRL-1307
Projs. RDT/E-1N022601A086, RDT/E-1N022601A088

Descriptors: (*Concrete, *Gamma-ray scattering), (*Shielding, Gamma rays), Monte Carlo method.

Secondary gamma ray transmission data are presented for monoenergetic secondary gamma ray sources in concrete slabs of various thicknesses. The data presented have been computed using the Monte Carlo method. These secondary gamma ray transmission data along with an appropriate weighting scheme allow one to determine the secondary gamma ray transmission information for any depth distribution of secondary gamma rays in plane concrete slabs. (Author)

ORNL-TM-977 **Field 18F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
RAPID COMPUTATION OF SPECIFIC ENERGY LOSSES FOR ENERGETIC CHARGED PARTICLES,
by R. W. Peelle. Sep 64, 21p
Contract W-7405-eng-26

Descriptors: (*Reactor shielding calculations, Digital computers), (*Reactor shielding materials, Charged particles).

18G. RADIOACTIVE WASTES

BNWL-170 **Field 18G**
CFSTI Prices: HC$2.00 MF$0.50
Battelle, Northwest, Richland, Wash. Pacific Northwest Lab.
RESEARCH AND DEVELOPMENT ACTIVITIES FIXATION OF RADIOACTIVE RESIDUES.
Quarterly progress rept. Jul-Sep 65,
by A. M. Platt. Oct 65, 40p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Processing), (*Wastes (Industrial), Disposal).

BNWL-173 **Field 18G, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
CONTINUOUS SEPARATION OF CERIUM FROM TRIVALENT RARE EARTHS BY PERSULFATE OXIDATION AND D2EHPA SOLVENT EXTRACTION: PILOT PLANT STUDIES,
by G. L. Richardson. Nov 65, 21p
Contract AT (45-1)-1830

Descriptors: (*Cerium, Separation), (*Rare earths, Cerium).

BNWL-180 **Field 18G, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
ADSORPTION OF TRACE IONS FROM INTERMEDIATE-LEVEL RADIOACTIVE WASTES BY ION EXCHANGE,
by B. W. Mercer. Jan 66, 33p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Ion exchange), (*Ion exchange resins, Adsorption).

IDO-14670 **Field 18G**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
STABILITY STUDIES OF HIGHLY RADIOACTIVE ALUMINA CALCINE DURING HIGH TEMPERATURE STORAGE,
by M. W. Wilding and D. W. Rhodes. Jan 66, 13p
Contract AT (10-1)-205

Descriptors: (*Radioactive waste, Storage), (*Wastes (Industrial), Stability).

18H. RADIOACTIVITY

ANL-7104 **Field 18H, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
ENVIRONMENTAL RADIOACTIVITY AT ARGONNE NATIONAL LABORATORY. REPORT FOR 1964,
by J. Sedlet and F. S. Iwami. Oct 65, 45p
Contract W-31-109-eng-38

Descriptors: (*Radioactivity, Monitors), (*Environmental tests, Radioactivity).

BNWL-196 **Field 18H**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress rept. 1 Oct 65-1 Jan 66.
3 Jan 66, 11p
Contract AT (45-1)-1830

Descriptors: (*Tungsten alloys, Technetium alloys), (*Technetium, Recovery).

DP-1006 **Field 18H, 6R**
CFSTI Prices: HC$2.00 MF$0.50
DuPont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
SAVANNAH RIVER PLANT CRITICALITY DOSIMETRY SYSTEM,
by Charles N. Wright, John E. Hoy, and William F. Splichal Jr. Nov 65, 27p
Contract AT (07-2)-1

Descriptors: (*Radioactivity, Dosimeters), (*Dosimeters, Health physics).

IDO-17112 **Field 18H, 18D**
CFSTI Prices: HC$4.00 MF$1.00
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
INSTRUMENT DEVELOPMENT BRANCH ANNUAL REPORT, 1964,
by N. Wilde, T. J. Boland, and S. D. Anderson. Dec 65, 101p
Contract AT (10-1)-205

Descriptors: (*Radioactivity, Radiation measurement systems), (*Radiation measurement systems, Nuclear reactors).

NYO-3276-8 **Field 18H, 18D**
CFSTI Prices: HC$2.00 MF$0.50
Isotopes, Inc., Westwood, N. J.
HIGH ALTITUDE BALLOON SAMPLING PROGRAM THIRD QUALITY CONTROL.
Progress rept.,
by Fernando Bazan, and Colin G. Sanderson. 15 Dec 64, 30p
Contract AT (30-1)-3276

Descriptors: (*Radioactivity, Radiation monitors), (*Radioactive isotopes, Atmosphere).

NYO-3276-9 **Field 18H, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Health and Safety Lab., New York Operations Office (AEC), N. Y.
HIGH-ALTITUDE BALLOON SAMPLING PROGRAM FOURTH QUALITY CONTROL.
Progress rept. Jul-Dec 64,
by John M. Matuszek, Jr., and Colin C. Sanderson. 31 Mar 65, 20p
Contract AT (30-1)-3276

Descriptors: (*Radioactivity, Radiation monitors), (*Radioactive isotopes, Atmosphere).

N66-15502 **Field 18H, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy Establishment, Trombay (India). Electronics Div.
FACILITY FOR STANDARDIZATION OF RADIONUCLIDES,
by K. C. Dhingra, V. C. Gupta, S. C. Misra, N. P. S. Sidhu, and P. K. Srivastava. 1965, 38p
AEET-224

Descriptors: *Disintegration, *Radioactive nuclide, *Standardization, *Purity.

N66-15521 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Department of Atomic Energy, Bombay (India).
MEASUREMENTS OF RADIOACTIVE FALLOUT IN INDIVIDUAL RAIN SHOWERS AT BOMBAY,
by V. S. Bhatnagar and S. Sadasivan. 1965, 37p
AEET-215

Descriptors: *Radioactive fallout, *India, *Meteorology, *Rainstorm.

SC-RR-65-396 **Field 18H, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
MIE SCATTERING FUNCTIONS (MSF) COMPUTER PROGRAM DESCRIPTION,
by D. F. Warnke. Feb 66, 55p
Contract AT (29-1)-789

Descriptors: (*Radioactive fallout, Particle size), (*Programming (Computers), Scattering).

AD-632 716 **See Field 9A**

AD-632 762 **See Field 5A**

AD-633 105 **See Field 5A**

AD-633 116 **See Field 4A**

AD-633 307 **See Field 18M**

CONF-799-12 **See Field 18D**

NYO-2915-1 **See Field 7E**

PB-170 177 **See Field 5C**

18I. REACTOR ENGINEERING AND OPERATION

AD-632 925 **Field 18I, 15D**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
NUCLEAR REACTOR DEVELOPMENT IN EGYPT.
Summary of data,
by Anatol Surak. 1 Apr 66, 21p ATD-66-32
Surveys of Western Scientific and Technical Literature.

Descriptors: (*Nuclear reactors, *Egypt), Abundance, Research reactors, Power reactors, Management planning, Personnel, Symposia, Nuclear physics laboratories, Reviews.

This summary of data is based on Western open sources published 1957-1965. There are four parts to this report. In the Introduction (Part 1) the author cites the lack of information in Western sources on nuclear reactor development in Egypt. Available information indicates that Egypt has only one research reactor (supplied by the Soviet Union) and one power reactor (currently under construc-

tion). A few nuclear research laboratories are in operation with several more under construction. For the time being, the Egyptian nuclear reactor development program is heavily dependent on foreign cooperation and assistance; however, great emphasis is being placed on the development of a national nuclear engineering capability, according to the author. In Part 2 (The Egyptian Atomic Energy Commission) the author traces briefly the development of this commission, the abolishment of same, and the subsequent establishment of the Atomic Energy Institute. Part 3 (Personalities) inludes names of members of the Atomic Energy Commission, names of scientists employed by the commission, names of assigned specialists, names of members of educational and other special missions sent abroad by the commission, and names of those sent to scientific conferences. Part 4 (Facilities) discusses the 2 Mw (th) research reactor at Inchass and the 150 Mw (e) power reactor at Borg-el-Arab. A bibliography, comprising 12 entries, completes the report. (Author)

ANL-7073 **Field 18I, 20D, 12B**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
SELF-SUSTAINED HYDRODYNAMIC OSCILLATIONS IN A NATURAL-CIRCULATION TWO-PHASE-FLOW BOILING LOOP,
by Kamal C. Jain. Aug 65, 122p
Contract W-31-109-eng-38

Descriptors: (*Mathematical models, Two-phase flow), (*Two-phase flow, Oscillation).

ANL-7122 **Field 18I, 18J, 18K**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, NOVEMBER 1965.
27 Dec 65, 102p
Contract W-31-109-eng-38

Descriptors: (*Liquid metals cooled reactors, Reactor fuels), (*Fast reactors, Reactor materials).

AP NOTE 427 **Field 18I**
CFSTI Prices: HC$2.00 MF$0.50
ALCO Products Inc., Schnectady, N. Y. Nuclear Power Engineering Dept.
FEASIBILITY STUDY FOR IN-PLACE ANNEALING OF THE PM-2A REACTOR VESSEL,
by E. Medal. 29 Jun 62, 28p
Contract AT (30-1)-2639

Descriptors: (*Pressure vessels, Annealing), (*Reactor feasibility studies, Pressure vessels).

BNL-955 **Field 18I, 18L**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
LIQUID FUEL SYNTHESIS USING NUCLEAR POWER IN A MOBILE ENERGY DEPOT SYSTEM.
by M. Beller and M. Steinberg. Nov 65, 11p
Contract AT-30-2-GEN-16

Descriptors: (*Fuels, Synthesis (Chemistry)), (*Nuclear power plants, Fuels).

BNL-966 **Field 18I, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Brookhaven National Lab., Upton, N. Y.
DESCRIPTION OF THE ENDF SERVICE ROUTINES,
by Henry C. Honeck, and Joan Felberbaum. Dec 65, 124p
Contract AT-30-2-GEN-16

Descriptors: (*Nuclear engineering, Programming languages), (*Programming (Computers), Punched cards).

BNWL-160 **Field 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
MIGRATION AREA AND MODERATOR REACTIVITY COEFFICIENTS FOR THE H2O MODERATED, 1.6 WT PERCENT PU-AL LOADING IN THE PRCF,
by V. O. Uetinen, A. L. Pitner, and W. F. Stinson. Oct 65, 15p
Contract AT (45-1)-1830

Descriptors: (*Reactor lattice parameters, Reactor modulators), (*Reactor modulators, Reactor fuels).

BNWL-176 **Field 18I, 18M**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
DETERMINATION OF MAXIMUM NUCLEAR TUBE POWERS BASED ON BOILING BURNOUT,
by G. M. Hesson. Dec 65, 17p
Contract AT (45-1)-1830

Descriptors: (*Boiling, Heat transfer), (*Test reactors, Reactor fuel elements).

BNWL-177 **Field 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PROPOSED TUBE POWER LIMITS FOR THE PRTR 58-INCH MK I FUEL ELEMENT,
by G. M. Hesson. Dec 65, 19p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Pipes), (*Pipes, Test reactors).

BNWL-183 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$1.00
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SOME NOVEL PLUTONIUM FUELING METHODS FOR THERMAL REACTORS.
Nov 65, 105p
Contract AT (45-1)-1830

Descriptors: (*Thermal reactors, Reactor fuels), (*Reactor fuels, Plutonium).

COO-1454-1 **Field 18I**
CFSTI Prices: HC$3.00 MF$0.50
Kellogg (M.W.) Co., Jersey City, N. J.
PRIMARY PIPING FLEXIBILITY ANALYSIS FOR LIQUID-METAL-COOLED FAST BREEDER REACTORS,
by J. T. McKeon. 20 Aug 65, 54p RD-65-1084
Contract AT (11-1)-1454

Descriptors: (*Pipes, Reactor coolants), (*Flexible structures, Nuclear engineering).

DP-1037 **Field 18I, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
FINAL SAFETY ANALYSIS OF THE MAXIMUM CREDIBLE ACCIDENT IN THE HEAVY WATER COMPONENTS TEST REACTOR,
by L. M. Arnett, Charles P. Ross, Ben C. Rusche, andC. D. Taylor. Dec 65, 30p
Contract AT (07-2)-1

Descriptors: (*Reactor accidents, Test reactors), (*Reactor hazards, Reactor safety systems).

IDO-17003 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
ADDENDUM TO THE SPERT III HAZARDS SUMMARY REPORT - LOW-ENRICHMENT OXIDE CORE,
by J. E. Houghtaling, J. A. Norberg, and J. C. Haire.Oct 65, 98p
Contract AT (10-1)-205

Descriptors: (*Radiation hazards, Reactor cores), (*Reactor cores, Reactor accidents).

IDO-17123 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SPERT PROJECT.
Quarterly technical rept. Apr-Jun 65,
by J. G. Crocker. Jan 66, 66p
Contract AT (10-1)-205

Descriptors: (*Reactor safety systems, Reactor fuels), (*Reactor system components, Reactor materials).

Identifiers: Spert project.

IITRI-578P22-12 **Field 18I, 18J**
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT STRUCTURES.
Bi-monthly progress rept.,
by R. L. Chiapetta, and M. A. Salmon. Dec 64, 28p
Contract AT (11-1)-578

Descriptors: (*Containment, Penetration), (*Pressure vessels, Containment).

LA-3384 **Field 18I, 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE MOLTEN PLUTONIUM BURNUP EXPERIMENT,
by W. H. Hannum and L. D. Kirkbride. 2 Sep 65, 76p
Contract W-7405-eng-36

Descriptors: (*Fuel burn up, Plutonium alloys), (*Plutonium alloys, Reactor fuels).

ORNL-3885 **Field 18I, 18J**
CFSTI Prices: HC$7.00 MF$1.50
Oak Ridge National Lab., Tenn.
GAS-COOLED REACTOR PROGRAM.
Semiannual progress rept. for 30 Sep 65.
Feb 66, 319p
Contract W-7405-eng-26

Descriptors: (*Gas-cooled reactors, Reactor fuels), (*Reactor materials, Gas-cooled reactors).

TID-21726 **Field 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Institutt for Atomenergt, Kjeller (Norway).
NORA PROJECT PROGRESS REPORT, DECEMBER 1961 - JUNE 1962. SECOND REPORT.
Jun 62, 13p
Contract 104/US

Descriptors: (*Reactor lattice parameters, Reactor cores), (*Reactor system components, Reactor theory.

Identifiers: Nora project.

TID-21733 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$1.00
Institut for Atomenergi, Kjeller (Norway).
NORA PROJECT. SUMMARY REPORT FOR PERIOD 1961-1964.
Feb 65, 123p NC-63
Contract AT (30-1)-2466

Descriptors: (*Boiling water reactors, Reactor cores), (*Reactor lattice parameters, Research reactors).

Identifiers: Nora project.

WAPD-T-1728 **Field 18I, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Bettis Atomic Power Lab., West Mifflin, Pa.
THE ANALYTICAL AND MONTE CARLO ANALYSIS OF AN EXPERIMENT DESIGNED TO ILLUSTRATE SPATIAL AND ENERGY INTERFERENCE AMONG RESONANCE NUCLIDES,
by N. R. Candelore, and R. C. Gast. Dec 64, 18p
CONF-654-51
Contract AT (11-1)-GEN-14
Presented at American Nuclear Society Meeting, San Francisco, Nov-Dec 64.

Descriptors: (*Critical assembles, Reactor system components), (*Neutron transport theory, Monte Carlo method).

WAPD-299 **Field 18I, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Bettis Atomic Power Lab., Pittsburgh, Pa.
DECONTAMINATION OF THE SHIPPINGPORT ATOMIC POWER STATION,
by C. S. Abrams, and E. A. Salterelli. Jan 66, 81p
Contract AT-11-1-GEN-14

Descriptors: (*Nuclear power plants, Decontamination), (*Decontamination, Reactor safety systems).

WCAP-6078 **Field 18I, 18J, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
YANKEE CORE EVALUATION PROGRAM.
Semi-annual progress rept. 30 Sep 65,
by M. J. Oboyle. Oct 65, 65p
Contract AT (30-1)-3017

Descriptors: (*Reactor cores, Fuel burn up), (*Reactor fuels, Reactor cores).

ANL-6969 **See Field 18J**

BNL-972 **See Field 18J**

DP-944 **See Field 18D**

LA-3431 **See Field 18D**

ORNL-P-1182 **See Field 18E**

18J. REACTOR MATERIALS

ANL-6417 **Field 18J, 18L**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
THE FABRICATION AND TESTING OF DEPLETED URANIUM BLANKET SLUGS FOR EBR-II,
by W. R. Burt Jr., R. D. McGowan, and C. H. Bean.Nov 65, 21p
Contract W-31-109-eng-38

Descriptors: (*Breeder reactors, Reactor fuel elements), (*Reactor fuel elements, Uranium).

ANL-6898 **Field 18J, 7A**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
ENGINEERING DEVELOPMENT OF FLUIDBED FLUORIDE VOLATILITY PROCESSES. PART 3. FLUID -BED FLUORINATION OF URANIUM DIOXIDE FUEL PELLETS,
by L. J. Anastasia, J. D. Gabor, and W. J. Mecham.Aug 65, 81p
Contract W-31-109-eng-38

Descriptors: (*Fluidized bed processes, Reactor fuels), (*Fluorination, Fluidized bed processes).

ANL-6969 **Field 18J, 18I, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
PRODUCTION OF PLUTONIUM MONOCARBIDE BY REACTION OF ELEMENTAL PLUTONIUM AND CARBON,
by William G. Tope. Jul 65, 27p
Contract W-7405-eng-38

Descriptors: (*Reactor fuels, Breeder reactors), (*Uranium compounds, Carbides).

ANL-6973 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
ENGINEERING DEVELOPMENT OF FLUIDBED FLUORIDE VOLATILITY PROCESSES. PART 8. PILOT-PLANT DEVELOPMENT OF A PROCESS FOR URANIUM ALLOY FUELS,
by John T. Holmes, Howard Stethers, andJohn J. Barghusen. Aug 65, 63p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuels, Uranium alloys), (*Uranium alloys, Fluidized bed processes).

ANL-7062 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
GLASSY MATERIALS FOR NUCLEAR REACTOR APPLICATIONS,
by E. D. Lynch. Nov 65, 26p
Contract W-31-109-eng-38

Descriptors: (*Reactor materials, Nuclear reactors), (*Glass, Reactor materials).

ANL-7070 **Field 18J, 11F, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
MECHANICAL PROPERTIES OF URANIUM COMPOUNDS,
by C. R. Tottle. Nov 65, 31p
Contract W-31-109-eng-38

Descriptors: (*Uranium compounds, Mechanical properties), (*Ceramic materials, Uranium compounds).

ANL-7079 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
ON THE THEORY OF MIGRATION AND COALESCENCE OF BUBBLES IN SOLIDS,
by E. E. Gruber. Nov 65, 22p
Contract W-31-109-eng-38

Descriptors: (*Bubbles, Atomic structure), (*Reactor materials, Bubbles).

ANL-7116 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
A NEW TECHNIQUE FOR EXPERIMENTAL INVESTIGATION OF HIGH-TEMPERATURE THERMAL DIFFUSIVITY OF URANIUM DIOXIDE UNDER TRANSIENT CONDITIONS,
by Leslie D. Montgomery. Nov 65, 43p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuels, Thermal diffusion), (*Uranium compounds, Dioxides).

BMI-1751 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING NOVEMBER 1965,
by Russell W. and Stan J. Paprocki. 1 Dec 65, 25p

Contract W-7405-eng-92

Descriptors: (*Reactor materials, Reactor fuel plates), (*Reactor fuels, Fuel burn up).

BNL-972 **Field 18J, 18I, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW. A BIMONTHLY TECHNICAL PROGRESS REVIEW. VOLUME 3, NUMBER 6.
Dec 65, 40p
Contract AT (30-2)-GEN-16

Descriptors: (*Liquid metals, High-temperature research), (*Nuclear engineering, Liquid metals).

BNWL-174 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
UNDERWATER REFURBISHING OF FUEL ELEMENTS,
by C. H. Allen and R. E. Sharp. Dec 65, 17p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel rods, Underwater), (*Reactor fuel elements, Maintenance).

BNWL-178 **Field 18J, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
RADIATION-INDUCED DIMENSIONAL CHANGES OF RAW -COKE GRAPHITES,
by J. W. Helm. Dec 65, 15p
Contract AT (45-1)-1830

Descriptors: (*Reactor materials, Graphite), (*Graphite, Radiation damage).

CEND-540 **Field 18J, 18L**
CFSTI Prices: HC$5.00 MF$1.00
Combustion Engineering Inc., Windsor, Conn. Nuclear Div.
ANALYTICAL AND EXPERIMENTAL METHODS OF DETERMINING HEAVY-ISOTOPE CONTENT OF OPERATING FUEL ELEMENTS,
by Michael F. Valerino, and Zoltan R. Rosztoczy.30 Sep 65, 156p
Contract AT (38-1)-207

Descriptors: (*Reactor fuel elements, Power reactors), (*Radioactive isotopes, Reactor fuels).

CONF-170 **Field 18J, 11F**
CFSTI Prices: HC$2.50 MF$1.25
Oak Ridge National Lab., Tenn.
CONFERENCE ON THE PHYSICAL METALLURGY OF BERYLLIUM HELD AT GATLINBURG, TENNESSEE, APRIL 30-MAY 1 63.
1 May 63, 247p
Contract W-7405-eng-26

Descriptors: (*Beryllium, Metallography), (*Reactor materials, Beryllium).

DP-1004 **Field 18J, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
DETERMINATION OF FLUORIDE BY PYROHYDROLYSIS AND AUTOMATED COLORIMETRY,

by David E. Harrington, and Robert S. Dorsett. Dec 65, 14p
Contract AT (07-2)-1

Descriptors: (*Fluorides, Separation), (*Reactor fuels, Fluorides).

GEAP-4578 **Field 18J**
CFSTI Prices: HC$4.00 MF$1.00
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
MECHANICAL DESIGN CONSIDERATIONS IN PRIMARY NUCLEAR PIPING,
by S. W. Tagart, Jr. Mar 65, 128p
Contract AT (04-3)-189

Descriptors: (*Nuclear power plants, Pipes), (*Pipes, Reactor materials).

K-P-3248 **Field 18J, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge Gaseous Diffusion Plant, Tenn.
SAMPLING URANIUM HEXAFLUORIDE,
by W. D. McCluen. 4 May 65, 16p SM-67/31
Contract W-7405-eng-26

Descriptors: (*Reactor fuel enrichment, Uranium), (*Uranium compounds, Fluorides).

LA-3367 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE BEHAVIOR OF COATED PARTICLES IN A LARGE NUCLEAR TRANSIENT (KIWI IN T),
by W. U. Geer, C. G. Hoffman, and J. F. Kerrisk. 1 Sep 65, 78p

Descriptors: (*Radiation damage, Reactor materials), (*Graphite, Reactor system components).

LA-3378 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
COATED PARTICLE FUEL ELEMENTS FOR UHTREX,
by J. M. Taub and R. J. Bard. Jul 65, 49p
Contract W-7405-eng-36

Descriptors: (*Reactor fuel elements, Reactor materials), (*Graphite moderated reactors, Reactor fuel elements).

Identifiers: Uhtrex.

LA-3399 **Field 18J, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THERMODYNAMIC PROPERTIES OF PU COMPOUNDS FROM EMF MEASUREMENTS. I. PU VERSUS, AG IN LICL-KCL EUTECTIC,
by G. M. Campbell, and J. A. Leary. 16 Sep 65, 18p
Contract W-7405-eng-36

Descriptors: (*Reactor fuels, Plutonium compounds), (*Plutonium compounds, Thermodynamics).

LA-3413 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
FISSION FRAGMENT REMOVAL OF URANIUM FROM A FISSIONING SURFACE. PART II,
by P. J. Peterson, and M. M. Thorpe. 15 Oct 65, 12p
Contract W-7405-eng-36

Descriptors: (*Uranium, Handling), (*Reactor fuel elements, Uranium).

NLCO-968 **Field 18J, 11F, 13H**
CFSTI Prices: HC$2.00 MF$0.50
National Lead Co. of Ohio, Cincinnati.
A STUDY OF AS-CAST AND HEAT-TREATED URANIUM-URANIUM CARBIDE ALLOYS BY OPTICAL AND ELECTRON MICROSCOPY,
by William A. Althaus, Marlin M. Cook, and Richard J. Bieker. Feb 66, 41p
Contract AT (30-1)-1156

Descriptors: (*Reactor materials, Uranium alloys), (*Uranium alloys, Carbides).

N66-15463 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Oesterreichische Studiengesellschaft Fuer Atomenergie, G.m.b.H., Seibersdorf.
DETERMINATION OF PU239 CONTENT IN NUCLEAR FUEL BY NEUTRON TRANSMISSION TECHNIQUE,
by T. Al-Khafaji, F. Putz, and P. Weinzierl. 1965, 15p SGAE-PH-28/1965
Presented at the Intern. Atomic Energy Agency Symp. on Nucl. Mater. Management, Vienna, 30 Aug-3 Sep 1965.

Descriptors: *Transmission, *Absorption cross section, *Neutron beam, *Nuclear fuel, *Plutonium 239.

N66-17582 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
NASA TUNGSTEN REACTOR RADIATION CHEMISTRY STUDIES. PHASE I-EXPERIMENT DESIGN,
by E. G. Bohlmann, G. H. Jenks, and H. C. Savage. Mar 66, 50p ORNL-TM-1403
NASA CR-54887

Descriptors: *Stability test, *Cadmium compounds, *Irradiation, *Water moderated reactor.

ORNL-3910 **Field 18J, 18L**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
BONUS REACTOR SUPERHEATER FUEL ASSEMBLIES. AN INVESTIGATION OF FAILURE AND METHOD OF CORRECTION,
by J. E. Cunningham, E. L. Long, Jr., E. A. Franco-Ferreira, and D. G. Harman. Dec 65, 173p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel rods, Failure (Mechanics)), (*Reactor materials, Reactor fuel rods).

Identifiers: Bonus reactor.

PB-169 538 **Field 18J, 7E**
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
MESURE DE LA PRESSION DE DISSOCIATION DU MONOCARBURE D'URANIUM ENTRE 2250 ET 2500K PAR LA METHODE D'EFFUSION DE KNUDSEN (Decomposition Pressure of Uranium Monocarbide by Knudsen Effusion Method Between 2250 and 2500K),
by Francois Anselin and Jean Poitreau. Jan 66, 29p CEA-R-2961
Text in French; Attached summary in English.

Descriptors: (*Uranium compounds, Decomposition), (*Uranium alloys, Decomposition), Phase studies, Carbides, Carbon alloys, Vapor pressure, Electron bombardment, Chemical analysis, Alpha particles, Fission products, Dissociation, Tungsten.

Identifiers: Uranium carbides.

RMI-3 **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Reactive Metals, Inc., Ashtabula, Ohio.
QUARTERLY PROCESS SUMMARY ON (EXTRUSION OF U), JULY-SEPTEMBER
29 Oct 65, 87p
Contract AT (30-1)-1405

Descriptors: (*Reactor fuel elements, Uranium), (*Uranium, Extrusion).

SC-DR-65-530 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
ION PLATING OF SPRF REACTOR PARTS,
by D. M. Mattox and R. D. Bland. Nov 65, 16p
Contract AT (29-1)-739

Descriptors: (*Plating, Ion bombardment), (*Ion bombardment, Metal coatings).

SC-R-65-997 **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
DESIGN CONSIDERATIONS FOR ION PLATING,
by D. M. Mattox. Jan 66, 53p
Contract AT (29-1)-789

Descriptors: (*Plating, Ion bombardment), (*Ion bombardment, Vacuum apparatus).

USBM-RC-1220 **Field 18J, 11F, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Albany, Oreg. Metallurgy Research Center.
QUARTERLY METALLURGY PROGRESS REPORT NUMBER 29, OCTOBER 1-DECEMBER 31, 1965.
31 Dec 65, 19p
Contract AT (11-1)-599

Descriptors: (*Reactor materials, Metallurgical laboratories), (*Metallurgy, Nuclear engineering).

ANL-7091 **See Field 7A**

ANL-7122 **See Field 18I**

ANL-7123 **See Field 7B**

BAW-1280-18 **See Field 18E**

BMI-1755 **See Field 11F**

BNWL-159 **See Field 7E**

BNWL-160 **See Field 18I**

BNWL-177 **See Field 18I**

BNWL-183 **See Field 18I**

CNLM-5537 **See Field 14B**

IDO-14669 **See Field 18B**

IDO-17003 **See Field 18I**

IDO-17123 **See Field 18I**

IITRI-578P22-12 **See Field 18I**

LA-3384 **See Field 18I**

NYO-2024-8 See Field 7D

ORNL-TM-977 See Field 18F

ORNL-3885 See Field 18I

RL-REA-2595 See Field 20B

TID-21726 See Field 18I

TID-21733 See Field 18I

WCAP-6078 See Field 18I

Y-1490 See Field 11F

18K. REACTOR PHYSICS

BNL-961 Field 18K
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
THE NEUTRON CROSS SECTION OF SODIUM BELOW 40 KEV,
by Thomas E. Stephenson. Dec 65, 23p
Contract AT-30-2-GEN-16

Descriptors: (*Neutron cross sections, Sodium), (*Nuclear energy levels, Reactor theory).

IDO-17114 Field 18K, 9B
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
IREKIN - PROGRAM FOR THE NUMERICAL SOLUTION OF THE REACTOR KINETICS EQUATIONS,
by R. J. Wagner. Jan 66, 84p
Contract AT (10-1)-205

Descriptors: (*Reactor kinetics, Differential equations), (*Programming (Computers), Reaction kinetics).

Identifiers: Irekin.

NAA-SR-MEMO-10632 Field 18K, 9B
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
AIREK-KEWB -- A PROGRAM FOR THE NUMERICAL SOLUTION OF THE SPACE INDEPENDENT REACTOR KINETICS EQUATIONS FOR KEWB,
by L. R. Blue, M. Hoffman, and M. Dunenfeld.
Oct 64, 52p
Contract AT-11-1-GEN-8

Descriptors: (*Reactor kinetics, Programming languages), (*Programming (Computers), Mathematical models).

ANL-7095 See Field 20H

ANL-7122 See Field 18I

IDO-17083 See Field 20H

IDO-17125 See Field 9B

LA-3384 See Field 18I

LA-3431 See Field 18D

WAPD-T-1728 See Field 18I

18L. REACTORS (POWER)

YAEC-143 Field 18L
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Dept.
YEAEC DEVELOPMENT PROGRAM FOR THE PERIOD JANUARY 1 TO JUNE 30, 1960,
by H. E. Walchli. Nov 59, 20p
Contract AT (30-3)-222

Descriptors: (*Reactor system components, Critical assemblies), (*Power reactors, Reactor system components).

ANL-6417 See Field 18J

BNL-955 See Field 18I

CEND-540 See Field 18J

LA-3368 See Field 10B

ORNL-3910 See Field 18J

WAPD-299 See Field 18I

WCAP-6078 See Field 18I

18M. REACTORS (NON-POWER)

AD-633 307 Field 18M, 18H
CFSTI Prices: HC$1.00 MF$0.50
Army Materials Research Agency, Watertown, Mass. Materials Research Div.
A LOW TEMPERATURE NEUTRON IRRADIATION FACILITY FOR STUDIES IN HOT-ATOM CHEMISTRY AND RADIATION DAMAGE STUDIES IN MATERIALS.
Technical rept.,
by John R. Hobbs, and Charles W. Owens. Feb 66, 25p AMRA-TR-66-05
Proj. DA-1C014501B32A,
Task 60140

Descriptors: (*Nuclear reactors, Low-temperature research), Nuclear reactions, Nuclei, Atoms, Radiation damage, Sodium compounds, Chlorates, Bromine compounds, Bromium, Radioactive isotopes, Materials, Carbon dioxide, Solids, Gamma-ray spectra.

Identifiers: Sodium bromate, Sodium chlorate.

A low temperature neutron irradiation facility has been constructed and tested for the AMRA research reactor. A description of the apparatus is given and results obtained for the low temperature (-80 C) neutron irradiation of mixed crystals of sodium bromate-sodium chlorate are presented. (Author)

BNWL-176 See Field 18I

DP-1037 See Field 18I

18N. SNAP TECHNOLOGY

AD-632 991 Field 18N, 13J
CFSTI Prices: HC$1.00 MF$0.50
Coast Guard, Baltimore, Md. Field Testing and Development Center.
SNAP-7A ISOTOPIC POWER SUPPLY FOR BUOYS.
Test rept.,
by J. E. Wesler. 2 Mar 66, 21p Rept. no. 437
Proj. CGTD-J7-6/3

Descriptors: (*Nuclear power plants, *Buoys), (*Auxiliary, power plants, Buoys), Degradation, Life expectancy, Thermoelectricity.

Identifiers: SNAP-7A isotopic power supply.

One SNAP-7A system was evaluated for approximately four years since its original delivery by the contractor. The performance of the SNAP-7A system deteriorated much more rapidly than predicted, so that its performance after four years is below that predicted at the end of its expected ten-year life. The fault appears to be a deterioration of the thermoelements in the thermoelectric generator of the system. (Author)

NAA-SR-MEMO-10660 Field 18N
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
SNAPTRAN 10A/2 - CRITICAL ASSEMBLY,
by R. P. Johnson. 1 Nov 64, 15p
Contract AT-11-1-GEN-8

Descriptors: (*Critical assemblies, Reactor system components), (*Auxiliary power plants, Reactor fuel elements).

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-632 683 Field 19A
CFSTI Prices: HC$1.00 MF$0.50
Naval Ammunition Depot, Crane, Ind.
EXPERIMENTS IN DEVELOPING GREEN FLARE FORMULAS,
by Carl Armour. 25 Sep 59, 22p RDTR-11

Descriptors: (*Flares, Materials), (*Colored flares, Materials), Combustion, Time, Flames, Temperature, Colors, Boron, Barium compounds, Nitrates, Polyvinyl chloride.

Identifiers: Barium nitrate.

Eighty green flare producing formulas were mixed and tested for burning time and quality of flame. Burning temperatures measured on twelve formulas containing barium indicate that an energy level associated with a temperature ranging from approximately 1100C to 1355C is required to produce a green color, with the more intense colors being produced at approximately 1300C. Below the above minimum temperature the flames were yellow, above the maximum the colors approached white light. The most promising formulas developed consisted of an efficient three component system containing boron, barium nitrate and polinyl chloride. (Author)

AD-632 684 Field 19A, 7B
CFSTI Prices: HC$1.00 MF$0.50
Naval Ammunition Depot, Crane, Ind.
CHEMICAL ANALYSIS OF A TYPICAL PHOSPHORUS SMOKE AND FLARE COMPOSITION,
by William Ripley. 9 Jun 60, 16p RDTR-16

Descriptors: (*Smoke munitions, Chemical analysis), (*Flares, Chemical analysis), Phosphorus, Zinc compounds, Manganese compounds, Magnesium, Vegetable oils, Solvent extraction, Chemical precipitation, Quantitative analysis.

Identifiers: Linseed oil, Manganese dioxide, Zinc oxide.

A scheme for the chemical analysis of a typical phosphorus composition of ZnO, Mg, Mn02, phosphorus, and linseed oil is described in detail. ZnO is removed by chromic acid solution, Mg by acetic acid, and the resulting mixture of phosphorus, MnO2, and linseed oil is brought into solution with HN3 and H2O2. Silica is removed and weighed. Mn is precipitated out as MnO2 and ignited to Mn3O4, EDTA is employed to chelate ions that might interfere with the phosphorus determination, and the phosphate precipitated out as the phosphomolybdate. Linseed oil is estimated by difference. (Author)

AD-633 085 **Field 19A, 9A**
CFSTI Prices: HC$1.10 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
ORDNANCE CORPS VIEWS ELECTROMAGNETIC RADIATION HAZARDS TO WEAPONS SYSTEMS,
by Donald E. Seeger. Apr 60, 7p Rept. no. 87
Supported in part by Naval Weapons Lab., Dahlgren, Va., and Sandia Corp., N. Mex.

Descriptors: (*Explosives initiators, *Electromagnetic waves), Hazards, Electromagnetic shielding, Radiofrequency power, Antennas, Attenuators, Impedance matching, Sensitivity, Weapon systems, Modulation, Circuits, Broadband.

There are at least seven factors involved in determining whether the electric initiator in the ordnance item will be activated by electromagnetic radiation. They are as follows: frequency or frequencies of radiation, form of radiation, i.e., pulsed, continuous wave, amplitude modulated, frequency modulated, power density of radiation at the receiving antenna, effective receiving antenna, i.e., tuned, untuned, presence of directors or reflectors, impedance presented to electromagnetic energy by the transducing element of the electric initiator, impedance match between receiving antenna and transducing element; characteristic sensitivity of the transducer-explosive assembly to electromagnetic energy. The problem of the hazards of electromagnetic radiation to ordnance is complicated by the interaction of the seven factors as well as the uncertainty of the environmental conditions. Based on the results of work conducted in this field, the electromagnetic radiation problem appears to be entirely solvable through the use of shielding, broadband attenuators, insensitive initiators and good basic engineering design of circuitry.

AD-633 115 **Field 19A, 19D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
SCALING UNDERWATER EXPLODING WIRES,
by James R. McGrath. 17 Dec 65, 29p NRL-6266
Proj. Bu Ships-SR-007-12-01-0800

Descriptors: (*Exploding wires, *Underwater explosions), Shock waves, Analysis, Measurement, Energy conversion.

Five-mil Nichrome wires have been exploded under water using a 1/2-microfarads capacitor which stored energy up to 100 joules. The results indicate that peak pressure scales like a chemical explosive if losses due to the circuit and joule heating of the wire itself are accounted for. On this basis, the equivalent weight of TNT represented by the electrical energy stored in the capacitor is W = 525 (0.325CV sub 0 squared--Ev)/Hd where W is the weight in micropounds, C is the capacitance in farads, V sub 0 is the initial charging voltage, Ev is the estimated energy dissipated by the wire in joules, and Hd is the heat of detonation of TNT in calories per gram. This scaling behavior extends the law of similarity six decades in terms of weight, from pounds to micropounds. The peak pressure for exploding-wire phenomena has been obtained from data and is empirically expressed as pm = 26,800 (cube root of W/R) to the 1.08 power where pm is peak pressure and R is pressure-gage distance. The instrument response to the short-duration shock wave gives rise to a new definition of the explosion constant tau sub e. The reduced time-constant parameter shows qualitative agreement in value and slope with chemical data scales, and is given empirically as : tau sub e/cube root of W = 70 (cube root of W/R) to the minus 0.22 power. (Author)

AD-633 255 **Field 19A, 13D, 8M**
CFSTI Prices: HC$1.00 MF$0.50
Army Engineer Research and Development Labs., Fort Belvoir, Va.
STEMMING PRESSURES ON BURIED MUNITIONS.
Technical rept.,
by Phillip J. Morris. Mar 66, 15p Rept. no. 1850
Proj. DA-1A022601A08906

Descriptors: (*Hydrostatic pressure, Underground structures), (*Ammunition, *Containers), Underwater, Environmental tests, Soil mechanics.

This report covers an investigation of pressures on buried munition containers. The condition examined is for right cylinders emplaced in a vertical cased shaft backfilled with a granular stemming material. The report concludes that a munition container of sufficient strength to withstand the hydrostatic pressure of a 25-foot head of sea water has adequate strength for underground burial. For the conditions analysed, the stress from an unsaturated, granular backfill for any depth hole will be less than the above-stated hydrostatic pressure. (Author)

AD-633 399 **Field 19A, 7D, 7B**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
NEW SALTS OF FULMINIC ACID,
by Lothar Wohler, Al. Weber, and A. Berthman-.Apr 66, 28p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1C014501A32B-01
AERDL T-1826-66, TT 66-61368
New Salze der Knallsaure, trans. of Chemische Berichte (West Germany) v62 p2742-58 1929.

Descriptors: (*Fulminates, Physical properties), Preparation, Chemical properties, Cyanides, Complex compounds, West Germany.

Identifiers: Fulminic acid, Cyanic acid.

Descriptions are given of the preparation and properties of the following: Fulminates of sodium, potassium, calcium, strontium, and barium. Complex fulminates of silver with ammonia and with magnesium. Complex pyridine fulminates with zinc, copper, silver, cadmium, mercury, and lead. Double salts of mercury fulminate with sodium thiosulfate, potassium bromide, and the chlorides of sodium, calcium, and magnesium. Complexes of ammonia with zinc and manganese fulminates. Complex salts of sodium and nickel fulminate, potassium and cobalt (III) fulminate, sodium-platinum (II) fulminate, calcium-strontium and barium-platinum (II) fulminates, sodium- aurofulminate, sodium-palladium (II) fulminate. The cuprofulminates of sodium, strontium, calcium, and barium. The cupric-di-cuprofulminate.

AD-633 414 **Field 19A, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THERMAL ANALYSIS OF PICRATES. DEHYDRATION, MELTING POINTS, INITIATING AND PREEXPLOSION TEMPERATURES OF PICRATES OF Al, Sc, Y, La, Ga, In AND Tl,
by T. Tucholskii. May 66, 26p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1C014501A32B
TT 66-61379, AERDL T-1846-66
Trans. of Roczniki Chemii (Poland) v14 p430-50 1934.

Descriptors: (*Explosive materials, Thermal properties), (*Nitrophenols, Thermal properties), Dehydration, Melting point, Temperature, Aluminum compounds, Scandium compounds, Yttrium compounds, Lanthanum compounds, Gallium compounds, Indium compounds, Thallium compounds, Triazides, Poland.

Identifiers: Picrates.

Picrates of scandium, yttrium, lanthanum, gallium and indium were obtained in the form of various hydrates. The temperatures and conditions of dehydration of picrates of group III elements were determined; the melting points and preexplosion temperatures were determined. Lanthanum picrate occasionally exploded prematurely at 2401. The data permit the conclusion that groups of elements located under one another in the successive periods of the periodic system produce picrates having a periodically recurring dependence of their initiating temperature ti on the atomic number of the picrate metal. This dependence is displayed by potassium and calcium metals, in which the highest value of ti is shown by the picrate of the second element in the series -- the minimum deviation from this rule is shown by scandium metal; in picrates of sodium, copper and silver, magnesium, zinc and cadmium and aluminum, gallium and indium, the elements located in the middle of the set of three show the lowest initiating temperatures. A similar behavior may be observed in triazides.

AD-632 686 **See Field 11G**

AD-632 818 **See Field 20D**

AD-633 316 **See Field 19D**

AD-633 317 **See Field 19D**

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-633 278 **Field 19D, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SPHERE DRAG MEASUREMENTS IN AN AEROBALLISTICS RANGE AT HIGH VELOCITIES AND LOW REYNOLDS NUMBERS.
Technical rept.,
by A. B. Bailey. May 66, 44p AEDC-TR-66-59
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Drag, Spheres), Ballistics, Projectiles, Hypersonic flow.

The drag coefficients of spheres for Re2 > 10 to the 4th have been measured in the velocity range 3000 < V sub infinity < 21,000 ft/sec with an accuracy of approximately + or - 1.5 percent. In addition, successful techniques for manufacturing and launching ultralightweight spheres (densities approaching 1 lb/cu ft) have resulted in the ability to measure sphere drag coefficient in the velocity range 3000 < V sub infinity < 12,000 ft/sec and Reynolds number range 3 < Re2 < 10 to the 6th, with an accuracy of approximately + or - 4 percent. This wide range of operating conditions has made it possible to study the initial departures of sphere drag coefficient from the high Reynolds number, continuum level and also to make measurements at free-stream Knudsen numbers approaching 1.0. The results of the tests at the low Reynolds numbers are shown to be consistent with the results obtained in other low-density, hypersonic-flow facilities. (Author)

AD-633 316 **Field 19D, 19A**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
EFFECT OF THE SHELL OF A CHARGE ON THE RELATIVE IMPULSE OF THE EXPLOSION,
by A. K. Parfenov, and A. Ya. Apin. 1964, 11p
Translation-2085
Vliyaniye Obolochki Zaryada na Othnositel'nyy Impul's Vzryva. Trans. of Vzryvnoye Delo, n52 p103-8 Sep 1963.

Descriptors: (*Cartridge cases, Charges (Explosive)), (*Explosions, Cartridge cases), (*Interior ballistics, Charges (Explosive)), Explosion effects, Shock waves, TNT, Detonation waves, USSR.

It was demonstrated that, with equal thicknesses or metallic shells enclosing charges of Trotyl of 1.63 g/cc density, the comparative impulse is greater in the shell in which the velocity of the shock wave is lower. Additional liberation of heat behind the detonation wave front of Trotyl in the presence of a shell was verified. (Author)

AD-633 317 **Field 19D, 19A**
CFSTI Prices: HC$1.10 MF$0.50
Department of the Navy, Washington, D. C.
DETERMINATION OF THE RELATIVE EFFECT OF HIGH EXPLOSIVES BY THE METHOD OF EQUIVALENT CHARGES BASED ON THE MAGNITUDE OF EXPANSION IN A TRAUZL BOMB,
by A. F. Belaev, and R. Kh. Kurbangalina. 1966, 14p Translation-2082
TT 66-61300
Opredelenie Otnositelnoi Rabotosposbnosti Vzryvchatykh Veshchestv Metodom Ekvivalentnykh Zaryadov po Velichine Rasshireniya v Bombe Trauzlya, trans. of Zhurnal Prikladnoi Mekhaniki Tekhnicheskoi Fiziki (USSR) n2 p116-9 1960.

Descriptors: (*Explosion effects, Determination), (*Bombs, Explosion effects), Charges (Explosive), Correlation techniques, Weight, USSR.

Data on the extent of expansion in a Trauzl Bomb, obtained by the method equivalent charges, can be used for the evaluation of the true relative productive capacities of explosives. To do this, it is necessary to determine the equivalent weight of an Ammonite 6 charge (or of one of some other explosive, chosen as a standard) with the help of a specially constructed graph. The charge of the standard explosive must produce the same expansion as the charge of the explosive being investigated. Volumes (heights) of the charges must be identical. For explosives having similar properties of their products of explosion the ratio of true productive capacities, determined from the expansions, is virtually equal to the ratio of specific heats. If the products of an explosion contain polyatomic molecules, or a suspension of the condensed phase, the ratio of productive capacities will be less than the ratio of specific heats. (Author)

AD-632 845 **See Field 4B**

AD-632 844 **See Field 4B**

AD-632 869 **See Field 15B**

AD-632 919 **See Field 4B**

AD-633 115 **See Field 19A**

AD-633 166 **See Field 4B**

AD-633 217 **See Field 4B**

AD-633 219 **See Field 4B**

19E. FIRE CONTROL AND BOMBING SYSTEMS

AD-632 838 **Field 19E, 19G, 1C**
CFSTI Prices: HC$2.00 MF$0.50
Springfield Armory, Mass.
ROCKET FIRE CONTROL OF XM16/XM21 ARMAMENT SUBSYSTEM FOR THE UH-1 HELICOPTER.
Technical rept.,
by Alan B. Katze. 31 Mar 65, 26p SA-TR20-9214
DA-11-4-50032-(04)-M1-M6
Rept. on proj. XM16 Development of Aircraft Gun Type Subsystems.

Descriptors: (*Rockets, *Aircraft fire control systems), (*Helicopters, Fire control systems), Weapon systems, Rocket assisted projectiles, Firing circuits, Synchros, Relaxation oscillators, Aerial gunnery, Air-to-surface, Close support, Safety devices, Static electricity.

Identifiers: XM16/XM21, UH-1 helicopter.

A rocket fire-suppression subsystem was designed and developed to arm helicopters with an increased air-to-ground defensive capability. The rocket fire control, i.e., the intervalometer, is a reliable and versatile electromechanical preset counter in which a solid-state gated relaxation-oscillator is used as a prime controller. Unique features of this subsystem are as follows: (1) All rockets are held at ground potential until ready to be fired. This completely eliminates premature and uncontrolled firing of rockets caused by electrostatic charges. (2) The firing circuit which incorporates solid-state switching is mechanically timed to prevent current flow until all switching functions are terminated. This provides a fire control with capability to perform 100,000 operating cycles with a minimum of attendant maintenance. (Author)

AD-632 846 **Field 19E**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
EFFECT OF DEPENDENCE CRITERION ON HIT PROBABILITIES ASSOCIATED WITH MULTIPLE WARHEAD OR SALVO FIRINGS,
by Robert C. Kline and Ralph E. Ferguson. 25 Mar 66, 29p NOLTR-66-37, Mathematics Dept-M-63
Task R-361-00-000/F008.98.12

Descriptors: (*Mathematical models, *Weapon systems), Probability, Warheads.

Identifiers: Hit probability, Salvo firings.

This report consists of a description and comparative study of three math models used in estimating salvo hit probabilities. A 'hit' is said to occur if at least one of the points defining the landing positions of the weapons coincides with a point defining the target area. The essential difference in these models is the assumed statistical dependence between the landing positions of the various members of a salvo. In each model the landing position of each weapon is assumed to have a circular normal distribution function. The first model assumes the landing position of the individual weapons of the salvo are independently and identically distributed. The second model assumes the salvo of weapons is dispersed in a well defined rectangular array. The third model assumes that the weapons which form the salvo are randomly distributed within a randomly distributed circular region where the center of the circle is determined by a random selection from a circular normal distribution. The adopted dependence criteria can, in general have a significant effect on outcomes of salvo firings, and whether or not one model is 'better' than another depends on the range and/or distribution of situations under consideration. (Author)

AD-462 338 **See Field 9B**

AD-632 715 **See Field 1C**

19G. ROCKETS

AD-632 838 **See Field 19E**

19H. UNDERWATER ORDNANCE

AD-632 800 **Field 19H**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
THE DESIGN OF VESSELS FOR UNDERWATER ORDNANCE,
by Charles J. Rodriguez. 17 Jun 55, 36p
NAVORD 3900
Previously announced Sep 56 as PB-120 814, LCmi$3.00, ph$6.30.

Descriptors: (*Pressure vessels, Design), (*Underwater ordnance, Pressure vessels).

The more important theories and concepts involved in the analysis and design of vessels subjected to external pressure are reviewed and discussed. Using the analysis of one investigator as a foundation, an equation is formulated which is subsequently employed in the construction of charts for practical design. The charts will yield an optimum design with a safety factor of unity since they incorporate a parameter for out-of-roundness, a fabrication anomaly heretofore accounted for by the application of factors to classical perfect-shell theory. Ranges of design parameters and operating depths that will find primary usage in the field of underwater ordnance are covered. A typical design example of a pressure hull for an undersea weapon is presented in conclusion. (Author)

AD-632 869 **See Field 15B**

20A. ACOUSTICS

AD-455 554 **Field 20A, 4A**
CFSTI Price: HC$1.60
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex. Environmental Sciences Directorate.
VARIATIONS IN THE SPEED OF SOUND DUE TO ATMOSPHERIC COMPOSITION,
by Richard D. H. Low. Jan 65, 13p ERDA-253
Task 1P620901A199-05

Descriptors: (*Acoustics, Atmosphere), (*Sound transmission, Atmosphere), Meteorological parameters, Analysis of variance, Velocity, Tables, Errors, Mathe matical analysis, Anemometers, Temperature, Ozone, Sound, Propagation.

By means of a simple error propagation formula, it is shown that the usual variations in atmospheric composition may introduce an error no greater than about two centimeters per second in the computation of the sound speed and, therefore, should be of negligible concern in the routine utilization of acoustics in either sound ranging or sonic thermoanemometry. (Author)

AD-455 966 Field 20A, 20D
CFSTI Price: HC$2.60
Schellenger Research Lab., Texas Western Coll., El Paso.
REDUCTION OF MICROPHONE WIND NOISE BY THE GENERATION OF A PROPER TURBULENT FLOW,
by Harold N. Ballard and Mike Izquierdo. Feb 65, 24p ERDA-262
Contract DA-36-039-AMC-03218 (E),
Task 1P620901A198-02
N65 17473

Descriptors: (*Microphones, Acoustics), (*Noise, Microphones), Reduction, Theory, Acoustic properties, Equations, Turbulence, Tests, Velocity, Reynolds num ber, Fluid flow, Wind.

A detailed theoretical and experimental study was made of the acoustic and noise reducing characteristics of a line microphone which is an outgrowth of the noise-reducing line microphone of Daniels. Modifications were made to the basic line microphone design and the acoustic characteristics of the modified system were determined. The information gained from this study, coupled with the theoretical implications of the Navier-Stokes equation for fluid flows at large and small Reynolds numbers and a consideration of the velocity-gradient-dependent nature of the viscous forces acting within a fluid, led to utilization of a new concept to reduce the flow speed of the air stream over the microphone system. This is accomplished by the use of a screening device which creates a turbulent flow of the proper characteristics so as to dissipate the flow energy of the air stream without interfering with the reception of the desired acoustic signals. Wind tunnel and field test records are presented which indicate that the underlying basic concept is correct and that the wind-noise generated by the interaction of the wind stream with an open low-frequency response microphone (0.1 to 50 cycles/sec) can be reduced by a factor of 30 db at a wind speed of 20 miles/hr. (Author)

AD-455 968 Field 20A, 4A
CFSTI Price: HC$3.60
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex. Environmental Sciences Directorate.
A MEASUREMENT OF THE EFFECT OF ATMOSPHERIC TURBULENCE ON THE COHERENT PROPERTIES OF A SOUND WAVE,
by John W. Coffman. Jan 65, 36p ERDA-254
Proj. DA-1L013001A91A

Descriptors: (*Acoustics, *Atmospheric motion), (*Sound transmission, Atmosphere), Sound, Scattering, Electromagnetic waves, Sound generators, Air, Jets, Acoustic filters.

This report describes an experiment to measure with an acoustic diffraction grating the fluctuations of a sound wave due to atmospheric turbulence. The grating corresponds to a bandpass filter with a bandwidth of 0.01/cm in wave number. The measurement is related to the scattering of electromagnetic energy by periodic sound waves, an effect upon which the EMAC probe depends. Measurements were made at an acoustic wave length of 3.48 cm. Under the conditions of the tests, turbulence was found to have no effect on the sound wave. (Author)

AD-632 911 Field 20A
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
MEASUREMENTS OF ATTENUATION AND DISPERSION OF SOUND BY AN AEROSOL.
Summary rept.,
by Samuel Temkin, and Richard A. Dobbins. May 66, 31p Nonr-563 (37)/2
Contract Nonr-562 (37)

Descriptors: (*Aerosols, Acoustic properties), (*Sound, Aerosols), Propagation, Attenuation, Scattering, Oleic acids, Particle size, Theory.

Attenuation and dispersion of sound by an aerosol, composed of oleic acid and a nitrogen carrier gas, were measured with an acoustic interferometer. Mean particle size and concentration were measured in situ by spectrophotometric tests. The measurements of attenuation and dispersion show good agreement with the theory in the range covered. In particular, the maximum attenuation per wavelength and the maximum dispersion, that are predicted by the theory, were confirmed experimentally. (Author)

AD-632 912 Field 20A
CFSTI Prices: HC$1.00 MF$0.50
Navy Underwater Sound Lab., New London, Conn.
THE EFFECT OF WIND SPEED ON THE SPATIAL CORRELATION OF AMBIENT NOISE,
by Beverly C. Hassell, and Frank J. Keltonic. 9 May 66, 17p USL-727
Task SF-101-03-15-11286

Descriptors: (*Acoustics, *Underwater sound), Sound transmission, Extremely low frequency, Wind, Surface area, Atlantic Ocean, Noise, Hydrophones, Bermuda, Marine geophysics.

Measurements of spatial correlation of ambient noise have been made in Bermuda over an 18-month period by means of a deep-water, bottom-mounted, vertical hydrophone array. Comparisons of these mean correlation values with theoretical values, which are based upon a surface-generated directional noise model, have been made for four frequency bands with wind speed as a parameter. The experimental and theoretical values show excellent agreement for frequency bands of 400-600 cps, 600-800 cps, and 800-1000 cps, regardless of the wind-speed conditions. For the frequency band of 200-400 cps, the agreement is wind-speed dependent: Better agreement is obtained at the higher wind speeds. These results serve to verify the applicability of the noise model for the higher frequencies (400-600 cps, 600-800 cps, and 800-1000 cps) and for the low frequencies (200-400 cps) when the surface noise levels are high enough to predominate over any horizontal noise components. (Author)

AD-633 146 See Field 13I

MND-3180-1 See Field 18B

N66-11629 See Field 1A

20B. CRYSTALLOGRAPHY

AD-632 673 Field 20B, 7D
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.,
STRUCTURE OF MATTER. FUNCTIONS OF MOLECULAR DISTRIBUTION AT VARIOUS TEMPERATURES IN A MONOCRYSTAL LIQUID ORIENTED WITH PARA-AZOXYPHENETOL,
by M. Pierre Delord and M. Jean Falgueirettes May 66, 8p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1P014501A-31B
AERDL T-1845-66
Trans. of Academie des Sciences, Paris. Comptes Rendus (France) v260 p2468-71 1965.

Descriptors: (*Single crystals, Crystal growth), (*Liquid crystals), Organic nitrogen compounds, Diffraction, Molecular structure, Temperature, France.

Identifiers: Azoxy phenetol, Liquid crystals, Azoxy anisole.

The radiation diffused by nematic liquid monocrystals was measured by diffractometry. The results obtained give an experimental function G (gamma) which is related with the distribution function f (theta) of the axes of the molecules by an integral equation. The function f (theta) was calculated at various temperatures for azoxyphenetol and corresponding degrees of order. (Author)

AD-633 004 Field 20B, 20L
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
DYNAMIC INTERACTIONS BETWEEN MOVING DISLOCATIONS AND SOLUTE ATOMS IN DILUTE SOLID SOLUTIONS.
Final rept. 1 Nov 64-31 Oct 65,
by G. S. Ansell. May 66, 7p
Grant DA-ARO (D)-31-124-G612,
Proj. ARO (D)-20014501B32D
AROD 5042:1

Descriptors: (*Crystal lattice defects, *Solid solutions), Strain (Mechanics), Diffusion, Iron, Carbon, Heat of activation, Transport properties, Stresses, Temperature.

The first aspect of the program concerned a theoretical model as to the effects of dilatational elastic strains upon the diffusivity of interstitial solute elements in metals. This work was extended to calculate the pipe diffusion of solute elements along edge dislocations as a function of both position within the cross section of the dislocation strain field and temperature. On the basis of this calculation, computation was made of the pickup of solute by moving dislocations in dilute solid solutions so as to be able to predict the stress-velocity relationships of dislocations in metals. The second aspect of the program concerned the development of an experimental study to determine the validity of both the general dislocation calculation and of the quantitative predictions derived. This work centered upon the design and construction of a gaseous diffusion apparatus in which the mass transport of diffusing species through metals could be quantitatively measured as a function of the defect structure contained within the metal. (Author)

AD-633 005 Field 20B, 11F
CFSTI Prices: HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y.
DISLOCATION MOBILITY AND INTERACTIONS IN HIGH PURITY MAGNESIUM.
Final rept. 1 Nov 61-30 Oct 64,
by G. S. Ansell. 30 Oct 64, 6p
Grant DA-ARO (D)-31-124-G209,
Proj. ARO (D)-009925001
AROD 3394:3

Descriptors: (*Magnesium, *Crystal lattice defects), Electron microscopy, Stresses, Temperature, Crystal substructure, Purification, Recrystallization, Single crystals, Surface properties.

A study was made to study the effect of purity, temperature, glide plane and substructure on the mobility and interactions of dislocations in magnesium.

AD-633 018 Field 20B, 11F
CFSTI Prices: HC$2.00 MF$0.50
Franklin Inst. Research Labs., Philadelphia, Pa.
LIQUID METAL EMBRITTLEMENT. PHASE III. A STUDY OF THE EFFECT OF LIQUID MERCURY ON SLIP ACTIVITY IN NEAR-SURFACE REGIONS OF ALPHA-BRASS SINGLE CRYSTALS.
Final technical rept., 1 Sep 65-31 Mar 66,
by R. N. Orava. Apr 66, 32p F-B2119-2
Contract Nonr-4225 (00),
Proj. NR-036-056

Phase 3 of Study of the Phenomenon of Metal Embrittlement.

Descriptors: (*Embrittlement, *Liquid metals), (*Deformation, Crystal lattice defects), Brass, Mercury, Etched crystals, Single crystals, Fracture (Mechanics), Plasticity.

Microstrain and etching experiments were conducted on 70/30 brass single crystals to determine the effect of the presence of liquid mercury at the surface on deformation characteristics in the early stages of plastic flow. It was revealed that dislocations become mobile at stresses as low as 0.04 kg.mm- to the -2 in annealed crystals, a sharp contrast to previous observations. A model is presented to explain the microstrain characteristics. A debris layer near the surface was observed to a depth of about 20 microns after 2 x 10 to the -3 plastic shear strain, irrespective of the presence of mercury. Thus, liquid mercury is equally as effective as an oxide film in impeding the emergence of dislocations from a crystal. Since the degree to which this type of behavior inhibits crack relaxation could not be determined, it was not possible to rigorously establish this as the mechanism for liquid metal embrittlement. (Author)

AD-633 051 **Field 20B, 7D, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.
DIFFUSE DOUBLE DIFFRACTION OF X-RAYS.
Technical rept.,
by S. L. Strong, and Roy Kaplow. 6 Apr 66, 25p
DSR-7954, TR-8
Contract Nonr-1841 (48)

Descriptors: (*X-ray diffraction analysis, *Monte Carlo method), Diffusion, Scattering, Atomic properties.

A Monte Carlo method has been used to evaluate the magnitude of twice scattered x-rays in diffraction experiments. The quantitative effects of variations in the primary scattering distribution, the absorption coefficient, the scattering power of the atoms, the x-ray wavelength, the specimen thickness, the monochromator and slit configuration and of polarization corrections have been derived. These factors have various influences on the magnitude and angular distribution of the twice scattered radiation.

ANL-6943 **Field 20B, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
A NEUTRON-DIFFRACTION STUDY OF URANYL NITRATE HEXAHYDRATE.
Final rept.,
by J. C. Taylor, and M. H. Mueller. Nov 65, 57p
Contract W-31-109-eng-38

Descriptors: (*Crystal structure, Least squares method), (*Neutron diffraction analysis, Crystallography).

RL-REA-2595 **Field 20B, 11F, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
PAPERS AND PROCEEDINGS OF THE MEETING ON APPLICATIONS OF X-RAY DIFFRACTION IN THE ATOMIC ENERGY FIELD, RICHLAND, WASHINGTON, FEBRUARY 25-26, 1965,
by W. G. Jolley and W. I. Clark. Oct 65, 79p
CONF-650210
Contract AT (45-1)-1350

Descriptors: (*Crystallography, X-ray diffraction analysis), (*X-ray diffraction analysis, Radiation damage).

AD-632 676 **See Field 20F**

AD-632 788 **See Field 11B**

AD-633 105 **See Field 5A**

AD-633 148 **See Field 20L**

CONF-650210-2 **See Field 11F**

ORNL-TR-490 **See Field 7D**

20C. ELECTRICITY AND MAGNETISM

32 764 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Electronics.
FIELD DEPENDENCE OF THE SPONTANEOUS MAGNETIZATION IN A HEISENBERG UNIAXIAL FERROMAGNET.
Technical note,
by S. Alexander and S. Shtrikman. 15 Dec 65, 15p TN-21
Contract AF 61 (052)-654

Descriptors: (*Field theory, Ferromagnetism), (*Ferromagnetic materials, *Magnetism), Solid state physics.

The field dependence of the spontaneous magnetization in a simple cubic Heisenberg uniaxial ferromagnet at 0K is studied in the spin wave approximation. The relative change of the magnetization from the fully aligned value is largest when the applied field is equal to the anisotropy field. The deviation is I/24 pi S (D/J to 3/2 power where D is the single ion anisotropy, J the exchange interaction and S the spin of the ion. The high and low field behaviour of the deviation are discussed in detail. (Author)

AD-632 765 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Electronics.
THE CRITICAL BEHAVIOR OF A WEAK FERROMAGNET.
Technical note,
by G. Gorodetsky, S. Shtrikman, and D. Treves. 15 Jan 66, 11p TN-23
Contract AF 61 (052)-654

Descriptors: (*Ferromagnetic materials, *Magnetism), Field theory, Ferromagnetism, Solid state physics.

Measurements of the temperature dependence of the magnetization in weak ferromagnetic YFe03 along the ferromagnetic direction in the critical region, 0.996<T/Tc<1.003, are reported. Analysis of the data gives the following results for the critical exponents: beta=0.55 plus or minus 0.04, gamma=1.33 plus or minus 0.04, gamma=0.7 plus or minus 0.1, 1/delta=0.36 plus or minus 0.03. (Author)

AD-632 892 **Field 20C, 20I, 20E**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa. Quantum Electronics Dept.
ARC DISCHARGE SOURCES.
Semiannual rept. for 16 Oct 65-15 Apr 66,
by Charles H. Church, Richard G. Schlecht, I. Liberman, B. W. Swanson, and E. Geil. 15 May 66, 92p
Contract Nonr-4647 (00), ARPA Order-306-62, Proj. NR-012-511

Descriptors: (*Electric arcs, Lasers), (*Lasers, Pumping (Electronics)), Light pulses, Xenon, Plasma medium, Electric discharges, Transport properties, Electrical conductance, Absorption spectrum, Temperature, Simulation, Spectra (Infrared), Spectra (Visible + ultraviolet).

Research is directed towards explaining quantitatively the pulsed arc xenon discharges used for the optical pumping of high energy lasers. A complete explanation of these discharges requires information on the physical properties of the xenon arc plasma as a function of temperature and pressure. ELECTRICAL CONDUCTIVITY OF HIGH DENSITY XENON PLASMAS, by R. G. Schlecht, C. H. Church, and I. Liberman. The electrical conductivity of a high density pulsed arc discharge in xenon has been measured. The experimental results agree very well with the Spitzer theory in the region of 1.6 to 2.5 particles per Debye sphere where the Kihara, Aono and Itikawa theory should be much better. STUDIES OF HIGHLY RADIATIVE PLASMAS USING THE WALL STABILIZED PULSED ARC DISCHARGE, by C. H. Church, R. G. Schlecht, I. Liberman, and B. W. Swanson. Plasmas with pressures exceeding one atmosphere and power densities to 300,000 watts/cu cm have been created in a confined pulsed arc discharge in xenon. Theoretical models for the arc have been studied for the cases for which a major portion of the input power is radiated in the optically thin spectral regions using a homogeneous temperature model. For the optically thick radiation and/or thermal conduction being dominant, techniques for solving integral differential power balance equation are being developed. LABORATORY SIMULATION OF HIGHLY RADIATIVE PLASMAS, by C. H. Church, R. G. Schlecht, and J. Liberman.

AD-633 015 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Electronics.
INTERNAL FIELD IN ORTHOFERRITES AND THE ONE THIRD LAW.
Technical note,
by M. Eibschutz, S. Shtrikman, and D. Treves.
1 Jan 66, 12p TN-22
Contract AF 61 (052)-654

Descriptors: (*Ferrites, *Magnetism), Mossbauer effect, Crystallography.

Identifiers: Orthoferrites.

The temperature dependence of the internal field in orthoferrites at the iron nucleus was measured using the Mossbauer effect. It was found that in the range 0.60T sub N <T <0.99 T sub N the internal field varies approximately as the 1/3 power of (1-T/T sub N). (Author)

AD-633 016 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Electronics.
TABULATION OF THE NUMBER OF INDEPENDENT COMPONENTS OF PHYSICAL TENSORS FOR THE MAGNETIC CLASSES.
Technical note,
by J. Tenenbaum. 1 Oct 65, 15p TN-18
Contract AF 61 (052)-654

Descriptors: (*Tensor analysis, *Magnetic properties), Invariance, Symmetry (Crystallography), Israel.

AD-633 240 **Field 20C, 20L**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y. Radiation and Solid State Lab.
PARAMAGNETIC RESONANCE IN THE SOLID STATE.
Final rept., 1 Jan-30 Jun 65,
by Hartmut P. Kallman. May 66, 29p
Contract DA-36-039-sc-89074,
Proj. DA-3A-99-25-003
ECOM 89074-F

Descriptors: (*Paramagnetic resonance, *Phosphorescent materials), Fluorescence, Luminescence, Crystals, Zinc compounds, Sulfides, Infrared radiation, Solid state physics.

The relationship between fluorescence, fluorescence quenching, light stimulation, glow areas, and the photo-induced EPR signals in excited Cr, Cu activated ZnS phosphors was studied. Two types of trap levels exist: deep traps due to chromium and shallow traps located in the neighborhood of ionized Cu activators; their trap populations are determined. Electron in both types of traps respond to IR but with a quite different IR wavelength dependence. IR shifts electrons from deep to shallow levels; heating shifts them in the reverse direction. IR raises electrons from deep traps into the conductivity level and is also absorbed by the ionized activators. The latter absorption gives rise to light stimulation or quenching. (Author)

N66-18330 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ELECTRON EMISSION WITH A TERMINATED IMAGE POTENTIAL,
by J. F. Morris. 28 Dec 64, 14p NASA-TM-X-56553

Descriptors: *Transmission coefficient, *Electron emission, *Image.

AD-632 670 **See Field 20I**

AD-632 788 **See Field 11B**

AD-632 808 **See Field 20L**

AD-633 251 **See Field 4A**

AD-633 298 **See Field 20H**

TID-20517 **See Field 20J**

20D. FLUID MECHANICS

AD-632 695 **Field 20D, 7D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Schenectady, N. Y. Research and Development Center.
STUDY OF THE SURFACE FILMS OF GAS NUCLEI (AS RELATED TO CAVITATION AND TENSILE STRENGTH IN WATER). PART 2.
Final rept., Jan 65-Dec 66,
by Leslie H. Bernd. Jan 66, 50p TIS-66-C-164
Contract Nonr-4296 (00)
See also AD-608 094.

Descriptors: (*Cavitation, Bubbles), (*Films, Tensile properties), (*Bubbles, Surface properties), Proteins, Gases, Nuclei, Water, Hydrocarbons, Test facilities, Solubility, Surface-active substances.

Cavitation produces gas nuclei in water. Trace materials in the water produce surface films about nuclei. Certain films prevent dissolving of nuclei and the acquisition of tensile strength. Conversely, the absence of films makes for rapid dissolving and the acquisition of tensile strength. Tensile strength is undesirable and leads to errors in cavitation testing. Water from various test facilities was therefore tested for film formation to determine the likelihood of acquiring tensile strength. Most of the water was found to have negligible film formation, and rapidly acquired tensile strength after cavitation. Various protein and hydrocarbon materials were used to produce surface films about nuclei to investigate film action, and find materials suitable for controlling dissolving. It was found possible by this means to produce water that ranged from no tensile strength gain after cavitation, to varying degrees of dissolving and tensile strength gain. It was found possible to match the various waters. (Author)

AD-632 714 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
LAMINAR AND TURBULENT BOUNDARY LAYERS ON SLIGHTLY-BLUNTED CONES AT HYPERSONIC SPEEDS,
by R. E. Wilson. 21 Mar 66, 35p NOLTR-66-54
Proj. 800-0100

Descriptors: (*Hypersonic characteristics, Conical bodies), (*Boundary layer transition, *Conical bodies), Blunt bodies, Mathematical analysis.

A momentum-integral method for calculating the boundary-layer growth on slightly-blunted cones has been given in a previous paper by the writer. The method, which was applied to cones with fully laminar flow, is extended in the present paper to turbulent flow. In addition: (1) transition data on cones at hypersonic speeds are examined to show the great effect of slight nose blunting on interpretation of the results, (2) agreement between measured and calculated cone drag coefficients for fully laminar flow is demonstrated, and (3) turbulent friction and boundary-layer thickness calculations are shown to agree with the limited amount of ballistics range data which are available. (Author)

AD-632 718 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Hydronautics, Inc., Laurel, Md.
A COMPARISON BETWEEN THEORETICAL AND MEASURED WAVES ABOVE A SUBMERGED RANKINE BODY.
Technical rept.,
by C. C. Hsu and B. Yim. Feb 66, 26p TR-231-10
Contract Nonr-3688 (00),
Proj. NR-220-016

Descriptors: (*Underwater objects, *water waves), Surface properties, Fluid dynamic properties, Mathematical analysis, Theory, Experimental data, Correlation techniques.

A comparison is made of theoretical and measured wave patterns produced by a submerged Rankine body (7:1) moving at constant speed. The measurements were made for a range of Froude numbers, but for a single depth/length ratio (1:3). Calculations were made for both the far and near fields. The former utilize the stationary phase approximation and the latter involve numerical integrations and include the local disturbance. In general, the agreement between theory and experiment is as good as the agreement between measurements taken at the same Froude number but for two different body lengths (4.5 and 9.0 feet). It is concluded from these tests that first-order wave theory predicts the shape and amplitude of the waves produced by a fully submerged body with sufficient accuracy for almost all practical purposes. (Author)

AD-632 787 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
Purdue Research Foundation, Lafayette, Inc.
AN EXPERIMENTAL INVESTIGATION ON THE EFFECT OF SUBSONIC INLET MACH NUMBER ON THE PERFORMANCE OF CONICAL DIFFUSERS.
Technical rept.,
by Robert V. Van Dewoestine and Robert W. Fox. Feb 66, 79p FMTR-66-1
Contract DA-31-124-ARO (D)-138,
Projs. DA-200-1050-1B700, ARO (D)-4332
AROD 4332:4

Descriptors: (*Diffusers, Aerodynamic characteristics), (*Duct inlets, Subsonic flow), Conical bodies, Performance (Engineering), Aerodynamic configurations, Incompressible flow, Nozzle gas flow, Compressible flow.

Experiments were performed to determine the effect of subsonic inlet Mach number on diffuser performance and flow regimes for a wide range of conical diffuser geometries. As the Mach number is increased, the flow tends more toward separation in all cases. Diffuser performance maps are presented for three different inlet Mach numbers (S sub I = 0.25, 0.55, 0.70). There is no significant variation in the location of the line of maximum performance at constant length to inlet radius ratio, line alpha-alpha, with Mach number. (Author)

AD-632 797 **Field 20D**
CFSTI Prices: HC$3.00 MF$0.75
Catholic Univ. of America, Washington, D. C. Dept. of Mechanical Engineering.
THE REATTACHMENT OF LAMINAR CAVITY FLOW WITH HEAT TRANSFER AT HYPERSONIC SPEED.
Technical rept.,
by Paul K. Chang. 30 Apr 66, 65p
Grant AF-AFOSR-706-65
AFOSR 66-0135

Descriptors: (*Laminar flow, *Hypersonic characteristics), (*Heat transfer, Laminar flow), Stagnation point, Blunt bodies, Jet mixing flow.

A study of cavity flow is made based upon the analysis of a physical model and by referring to the experimental data of a particular test model with the reattachment surface perpendicular to free stream direction at free stream Mach number of eleven. The pressure and heat transfer in the reattachment zone may be predicted approximately by the flow quantities along the dividing stream line employing the mixing theory and stagnation heat transfer equation for a blunt body. Good agreement with experimental data is obtained. It is found that the value of the average mixing rate correlation function for the cavity flow is 15 and is equal to that value determined by Glick for separated flow caused by shock impingement. Semi-empirically, efficiency factor of compression equal to 0.67 at the reattachment is evaluated and the reattachment velocity gradient parameter for the particular test model is similar to this case of stagnation flow over blunt nose. It appears that the heat transfer at the reattachment surface perpendicular to the free stream direction may be predicted approximately by the stagnation point heat transfer equation for a two-dimensional blunt surface. (Author)

AD-632 818 **Field 20D, 20I, 19A**
CFSTI Prices: HC$1.00 MF$0.50
Sydney Univ. (Australia). Dept. of Aeronautical Engineering.
NUMERICAL STUDIES IN GAS DYNAMICS.
Final scientific rept. 14 Mar 65-13 Mar 66,
by G. A. Bird. 16 Mar 66, 7p
Grant AF-AFOSR-915-65,
Proj. AF-9783,
Task 978302
AFOSR 66-0857

Descriptors: (*Superaerodynamics, *Numerical analysis), (*Plasma physics, Dynamics), Monte Carlo method, Simulation, Australia.

Identifiers: Magnetic mirrors, Hypervelocity launchers.

The report describes the work that has been carried out on the following topics:- (a) The application of a Monte Carlo simulation technique to additional problems in rarefied gas dynamics. In particular, an unfinished study of the breakdown of continum flow in steady expansions. (b) The numerical simulation of the motion of a test particle in an ionized gas. (c) An exact analytical solution for the compression of a highly rarefied plasma between converging magnetic mirrors. (d) The preliminary study of the theoretical performance of a multi-stage hypervelocity launcher. (Author)

AD-632 897 Field 20D, 20I
CFSTI Prices: HC$3.00 MF$0.75
Toronto Univ. (Canada). Inst. for Aerospace Studies.
REPORT ON INTERNATIONAL SYMPOSIUM ON RAREFIED GAS DYNAMICS (4th), TORONTO, JULY 14-17 1964,
byG. N. Patterson. 17 Jul 64, 67p
Grant Nonr (G)-00068-64

Descriptors: (*Gas flow, Symposia), (*Plasma medium, Gas flow), Reviews, Molecular beams, Kinetic theory, Shock waves, Canada, Aerodynamic characteristics.

The report contains reviews prepared during the meeting of papers in the following areas: transition flow, experimental techniques and apparatus, surface interactions, kinetic theory, molecular beams, internal flow, and rarefied plasmas and shock structure.

AD-633 007 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
POISEUILLE FLOWS WITH BOUNDARY DISTURBANCES.
Technical memo.,
by V. O'Brien. Mar 66, 41p TG-814
Contract NOw-62-0604-c

Descriptors: (*Laminar flow, *Numerical analysis), Viscosity, Flow separation, Dynamics.

Direct numerical solutions were obtained for steady Stokes flow in planar and axisymmetric channels with boundary disturbances. The flows with the disturbances considered, straightsided grooves in the wall or projections into the channel of various height to length ratio, show interesting (separated) recirculation regions. (Author)

AD-633 017 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
Colorado State Univ., Fort Collins.
FLUID MECHANICS PROGRAM: FLUID DYNAMICS AND DIFFUSION LABORATORY.
Jan 66, 42p

Descriptors: (*Fluid mechanics, *Research program administration), (*Laboratories, Fluid mechanics), Dynamics, Diffusion.

AD-633 019 Field 20D
CFSTI Prices: HC$5.00 MF$1.00
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
PRELIMINARY FLUTTER ANALYSIS. VOLUME I. WING.
Dec 65, 183p Rept. no. 163-Vol-1
Contract DA-44-177-TC-715
XV-5A Lift Fan Flight Research Aircraft Program.

Descriptors: (*Wings, *Flutter), Vertical take-off planes, Analysis, Ailerons, Rotation.

Identifiers: V-5 aircraft.

Results of the overall CEA analysis indicated that the XV-5A aircraft (wing), on the basis of the preliminary data utilized in the analysis, is free of flutter within the proposed flight envelope. Studies showed that mass-balancing of the aileron is a critical factor, and must be carefully evaluated for future design efforts on the XV-5A aircraft. Similarly, the overall spring restraint does affect the flutter characteristics, but the variation, at most, will still lie above 15% on V sub L or M sub L. The flutter mode, that of antisymmetric wing bending coupled with aileron rotation, indicates that proper aircraft simulation must be used in future flutter evaluation of the XV-5A aircraft with due attention given to fuselage and/or aircraft degrees of freedom. (Author)

AD-633 020 Field 20D
CFSTI Prices: HC$4.00 MF$1.00
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
PRELIMINARY FLUTTER ANALYSIS. VOLUME II. EMPENNAGE.
Dec 65, 129p Rept. no. 163-Vol-2
Contract DA-44-177-TC-715
XV-5A Lift Fan Flight Research Aircraft Program. See also AD-633 019.

Descriptors: (*Tails (Aircraft), *Flutter), Vertical take-off planes, Analysis, Pitch (Motion), Design, Frequency.

Identifiers: V-5 aircraft.

Results of the empennage flutter analysis indicate a possible flutter situation existing within the design flight envelope of the XV-5A aircraft. The flutter mode is characterized by horizontal tail pitch coupled with basically symmetric horizontal tail bending for low values of pitch frequencies (40 cps) and for pitch coupled with horizontal tail torsion at pitch frequencies greater than 40 cps. The required pitch frequency would be of the order of approximately 55 cps for a flutter velocity margin of 15% of the design limit dive speed at sea-level, which is the critical altitude. Establishment of the actual pitch frequency through experimental methods is required for definite determination of flutter margins. The analyses presented in this report should be taken as a preliminary evaluation of the empennage of the XV-5A aircraft. Subsequent analytical and experimental investigations should then be directed toward finalization of the actual flutter characteristics of the XV-5A aircraft, with due regard for the findings of the studies presented in the report. (Author)

AD-633 021 Field 20D
CFSTI Prices: HC$4.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
PRELIMINARY FLUTTER ANALYSIS. VOLUME III. CONTROL SURFACES.
Dec 65, 117p Rept. no. 163-Vol-3
Contract DA-44-177-TC-715
XV-5A Lift Fan Flight Research Aircraft Program. See also AD-633 020.

Descriptors: (*Control surfaces, *Flutter), Vertical take-off planes, Analysis, Ailerons, Trim tabs, Aerial rudders, Aeroelasticity, Equations, Stability.

Identifiers: V-5 aircraft.

Equations of motion and stability equations are formulated using lumped spring-mass idealization and incompressible strip theory aerodynamics; control system elasticity and inertia are taken into account. One altitude only, sea level, is investigated. Solutions of the stability equations are obtained, giving flutter frequencies and complex damping coefficients required to maintain flutter as functions of flutter velocities for various values of stiffness parameter, both with and without aerodynamic balancing (centering) of the control surface. Both a symmetric and an antisymmetric analysis of the aileron-aileron flight tab - aileron control system are made. An analysis of the rudder - rudder trim tab - rudder control system is included and a symmetric analysis of the horizontal stabilizer - elevator - elevator control system is also made. (Author)

AD-633 046 Field 20D, 12A
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
A PARAMETRIC METHOD OF INTEGRATING LAMINAR-BOUNDARY LAYER EQUATIONS.
ATD work assignment no. 79.
by Victor Klein. 28 Mar 66, 18p ATD-66-30
TT 66-61265
Trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR) n248 p45-55 1965.

Descriptors: (*Laminar boundary layer, Equations), (*Numerical methods and procedures, *Integration), Partial differential equations, USSR.

The article is divided into four parts: (1) The universal equation of the laminar boundary layer; (2) One-parameter solution; (3) Representation of the solution in the form of a series in powers of formparameters; (4) An example of calculating a boundary layer. Conclusion. A new method for solving the problems in the theory of the laminar boundary layer is presented. The fundamental equations of a two-dimensional isothermal laminar boundary layer are reduced to a 'universal' partial differential equation in terms of a reduced stream function containing certain boundary-layer parameters (called 'formparameters'), which express the influence of the velocity profile at the outer interface of the boundary layer on its characteristics. The numerical integration of the universal equation is carried out once and for all and is followed by a tabulation of the stream function, the skin-friction factor, and other characteristic quantities. These tables can be used to determine the required parameters for any other particular boundary-layer problem (after deriving a universal equation for it) by relatively simple calculations which do not require the use of electronic computers. (Author)

AD-633 118 Field 20D, 20M
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF APPLIED MECHANICS AND TECHNICAL PHYSICS (PMTF), (SELECTED ARTICLES),
31 Jan 66, 41p FTD-MT-65-538
TT 66-61272
Edited machine trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n1 p45-56, 88-92 1965.

Descriptors: (*Heat transfer, *Gas flow), (*Impact shock, Gas flow), Meteorites, Shock waves, Dissociation, USSR.

Contents: Determination of Heat Flow in the Environment of a Critical Point of Double Curvature During the Flowing Around of a Body by a Dissociating Gas of Arbitrary Chemical Composition, by G. A. Tirskiy; and Reactive Impulse at Large Speeds of Impact, by E. I. Andriankin.

AD-633 139 Field 20D, 1C
CFSTI Prices: HC$4.00 MF$0.75
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
LITERATURE SEARCH AND COMPREHENSIVE BIBLIOGRAPHY OF WINGS IN GROUND EFFECT AND RELATED PHENOMENA,
by William F. Foshag. Mar 66, 106p Rept. no. Aero-1098
DTMB 2179

Descriptors: (*Wings, Bibliographies), (*Ground effect, Wings), Seaplanes, Aerodynamic characteristics, Lift, Ground effect machines, Hydrofoils, Vertical take-off planes, Short take-off planes, Hydrodynamics, Meteorology, Airfoils, Wind tunnels.

Identifiers: Katzmayer effect.

A comprehensive survey and literature search is made of the general field of wings operating in ground effect and related phenomena. Comments are included of some of the papers published, to present a sketch of the methods of approach of a number of authors. The bibliography presents sources which consider the problem from the theoretical, experimental, and/or applications point of view. Tables are included which provide a convenient breakdown of the various sources, for a quicker method of locating specific referenc-

es dealing with an area of special interest to the reader. (Author)

AD-633 161 **Field 20D, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
OVERPRESSURES AND DURATIONS OF SHOCK WAVES EMERGING FROM OPEN-ENDED SHOCK TUBES.
Memorandum rept.,
by Brian P. Bertrand, and William T. Matthews.
Nov 65, 46p MR-1724
Proj. DA-1P014501A33E

Descriptors: (*Shock waves, Shock tubes), Pressure, Life expectancy.

The field wave overpressures and durations resulting from shock waves emerging from open-ended shock tubes have been measured. An equation has been developed from the measured data that relates the field overpressures (below 0.1 psi) resulting from a given shock tube pressure, to the tube diameter and distance from the tube exit. An equation has also been developed from the same data that relates the duration of the field wave (below 0.1 psi) to the exit areas of the tubes for a given shock tube pressure. Predictions of field overpressure and duration have been made for an eight foot diameter shock tube firing a 27 psi shock wave. (Author)

AD-633 199 **Field 20D, 12A**
CFSTI Prices: HC$6.00 MF$1.50
Purdue Univ., Lafayette, Ind.
ON THE CONVERGENCE AND EXACTNESS OF SOLUTIONS OF THE LAMINAR BOUNDARY-LAYER EQUATIONS USING THE N-PARAMETER INTEGRAL FORMULATION OF GALERKIN-KANTOROVICH-DORODNITSYN.
Doctoral thesis,
by Howard E. Bethel. Jun 66, 285p
Contract AF 33 (608)-1270

Descriptors: (*Laminar boundary layer, Equations), (*Boundary value problems, Approximation (Mathematics)), Integrals, Partial differential equations.

Identifiers: Theses, Galerkin-Kantorovich-Dorodnitsyn method.

The solution of the incompressible, laminar boundary-layer equations using the N-parameter integral method of Galerkin, Kantorovich and Dorodnitsyn is investigated. This method seeks to obtain an approximate solution of a partial differential equation with given boundary conditions by assuming the solution in functional form so that the boundary conditions for one variable are exactly satisfied. The approximating function is then specialized in such a manner as to obtain approximate satisfaction of the given equation. Solutions are presented for the similar flows and four types of nonsimilar flows: flows with an abrupt change from an initial region of flow to a constant velocity flow, analytically prescribed external flows, experimentally determined external flows, and flows which proceed from a stagnation point to a separation point. These results indicate that the GKD method yields solutions which are uniformly better than classical approximation techniques and are of about the same accuracy as the usual 'exact' numerical solution methods such as the series method, the Hartree-Womersley method and finite difference methods. Furthermore, solutions can be obtained as close to the separation point as computationally feasible. (Author)

AD-633 290 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Oceanics, Inc., Plainview, N. Y.
THEORETICAL CONSIDERATIONS OF THE STABILITY OF PULSATILE FLOW IN TUBES.
Final technical rept., Oct 64-Mar 66,
by Theodore R. Goodman. May 66, 25p 66-27
Contract Nonr-4432 (00),
Proj. RR-009-01-01

Descriptors: (*Fluid flow, Pipes), Dynamics, Stability, Perturbation theory, Numerical analysis, Iterative methods.

Hydrodynamic stability theory is applied to oscillatory flow in a pipe. A criterion for stability is established, and an attempt is made to solve the resulting eigenvalue problem using an iterative numerical method. Because of nonconvergence the question of stability remains unresolved. (Author)

AD-633 353 **Field 20D, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Colorado State Univ., Fort Collins. Fluid Dynamics and Diffusion Lab.
METEOROLOGICAL-TOWER INDUCED WIND-FIELD PERTURBATIONS (SUPPLEMENT).
Technical rept.,
by G. Hsi, and J. E. Cermak. May 66, 14p
CER66GH-JEC26
Grant DA-AMC-28-043-65-G20
See also AD-623 946.

Descriptors: (*Weather stations, Towers), (*Towers, Aerodynamics), (*Wind, Micrometeorology), Atmosphere, Gas flow, Structures, Perturbation theory, Anemometers, Fluid mechanics.

The specific objectives of this supplementary investigation are: (1) To study the mean wind pattern in the neighborhood of a meteorological tower subjected to the same mean ambient wind velocity but at different turbulence levels to determine the effect of turbulence on this mean wind velocity pattern; (2) to acquire measurements of wind speed at the anemometer position (boom mounted) for all possible wind directions. (Author)

LA-3422 **Field 20D, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THREE-DIMENSIONAL CARTESIAN PARTICLE-IN-CELL CALCULATIONS,
by William R. Gage, and Charles L. Mader. 10 Sep 65, 60p
Contract W-7405-eng-36

Descriptors: (*Three-dimentional flow, Computers), (*Hydrodynamics, Equations of state).

N66-11632 **Field 20D**
CFSTI Prices: HC$5.00 MF$1.00
Advisory Group for Aerospace Research and Development, Paris (France).
SUPERSONIC INLETS,
by Ione D. V. Faro. May 65, 162p AGARDograph-102

Descriptors: (*Diffusers, Supersonic characteristics).

N66-15475 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Oxford Univ. (England). Engineering Lab.
THE STARTING PROCESS IN A HYPERSONIC NOZZLE,
by C. E. Smith, Jr. Jul 65, 34p Rept. no. 1000

Descriptors: *Shock wave, *Expansion wave, *Fluid mechanics, *Hypersonic nozzle, *Starting.

N66-18373 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
USE OF ARBITRARY QUASI-ORTHOGONALS FOR CALCULATING FLOW DISTRIBUTION IN A TURBOMACHINE,
by T. Katsanis. 1965, 25p NASA-TM-X-52094
Presented at the Ann. Winter Meeting of the ASME, Chicago, Nov 7-11, 1965.

Descriptors: *Computer programming, *Flow distribution, *Orthogonal function, *Turbine.

PB-169 296 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Research Inst. of Sweden, Stockholm.
LAMINAR SEPARATION AND REATTACHMENT BEHIND A DOWNSTREAM FACING STEP AT HYPERSONIC MACH NUMBER, INCLUDING THE EFFECTS OF THE APPROACHING BOUNDARY LAYER,
by Robert A. White. May 65, 24p FFA-103

Descriptors: (*Laminar boundary layer, Flow separation), Hypersonic characteristics, Sweden.

PB-169 475 **Field 20D, 11F**
CFSTI Prices: HC$4.00 MF$1.00
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
ULTRASONIC-INDUCED CAVITATION STUDIES IN MERCURY AND WATER,
by R. Garcia, R. E. Nystrom, and F. G. Hammitt. Dec 65, 138p Technical rept. TR-3, ORA-05031-3-T
Grant NSF-G 22529

Descriptors: (*Cavitation, Ultrasonic radiation), Damage, Refractory metal alloys, Steel, Brass, Copper, Mechanical properties, Fluids, Mercury.

Ultrasonic-induced cavitation studies were conducted in mercury at 70F and 500F and in water at 70F on a wide variety of materials, which included various refractory alloys, steels, brasses, coppers, etc. Comprehensive computer correlations of the cavitation damage data with applicable mechanical and fluid properties were carried out. No one single material mechanical property can be used to correlate the damage data. In general, the best correlations include one or more energy-type mechanical properties, one or more strength-type properties, and one or more fluid coupling parameters, if the fluid properties are varied within the data set. No relatively simple single correlating equation applies well to all the data. (Author)

AD-455 966 **See Field 20A**
AD-632 675 **See Field 10A**
AD-632 694 **See Field 20F**
AD-632 697 **See Field 20I**
AD-632 755 **See Field 7D**
AD-632 828 **See Field 14B**
AD-632 829 **See Field 20K**
AD-632 849 **See Field 8C**
AD-632 851 **See Field 8C**
AD-632 924 **See Field 14B**
AD-633 026 **See Field 20I**
AD-633 027 **See Field 20I**

AD-633 088 See Field 4B

AD-633 277 See Field 14B

AD-633 278 See Field 19D

ANL-7073 See Field 18I

20E. MASERS AND LASERS

AD-453 191 Field 20E
CFSTI Price: HC$3.60
Korad Corp., Santa Monica, Calif.
SOLID STATE LASER AMPLIFIERS.
Quarterly rept. no. 6, 1 Jun-31 Aug 64,
by A. H. Gillmer, R. C. Pastor, and H. Schultz.Sep 64, 32p
Contract DA-36-AMC-00070 (E),
Proj. 1P6-22001-A-056
See also AD-446 163.

Descriptors: (*Lasers, Performance (Engineering)), (*Ruby, Lasers), (*Oscillators, Lasers), (*Yttrium compounds, Lasers), Optical phenomena, Amplifiers, Emissivity, Kerr cells, Oxides, Crystal growth, Ion exchange, Mirrors, Feedback, Color centers.

Identifiers: Ytrium oxide.

It was found that the power gain of a ruby amplifier can be highest in a region of poor optical quality. Ordinary laser action from this same laser rod can be emitted preferentially in the region of low power gain and high optical quality. A passively 'Q' switched oscillator was built. Preliminary data indicate that higher brightnesses can be achieved with a passive 'Q' switched oscillator-amplifier combination. A search for a fluxing material which will lower the growth temperature of Y2O3 without introducing color-center problems, has been unsuccessful thus far. Purification of Y2O3 powder by ion exchange is being carried out. (Author)

AD-633 014 Field 20E, 20F
CFSTI Prices: HC$3.00 MF$0.75
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.
TECHNIQUES FOR SUPER-MODE OSCILLATION.
Interim engineering rept. no. 3, 1 Dec 65-28 Feb 66,
by Russell Targ, B. J. McMurtry, J. M. Yarborough, andJ. M. French. 28 Feb 66, 77p
Contract AF 33 (615)-2884
See also AD-624 845.

Descriptors: (*Lasers, Frequency modulation), Optics, Monochromatic light, Mirrors, Servomechanisms, Phase-locked systems, Electrooptics.

Identifiers: Super-mode oscillation.

This report describes an experimental and theoretical program to determine the fundamental properties of the FM and super-mode lasers. These two techniques make it possible to obtain at a single frequency the full power of a high-power multimode laser without suffering the loss in power inherent in conventional approaches involving the suppression of modes. The work of this program is divided broadly between two main activities. The first is to obtain a more complete understanding of the physics governing the operation of the FM and super-mode lasers. The second is concerned with improving the techniques for coupling the modes of the FM laser and finding more efficient means for full power super-mode conversion of the FM signal to a monochromatic output.

N66-16967 Field 20E
CFSTI Prices: HC$1.00 MF$0.50
College of William and Mary, Williamsburg, Va.
MEASUREMENT OF LIGHT SCATTERED FROM A LASER BEAM BY THE ATMOSPHERE.
Semiannual status rept. no. 3, Jun 1-Nov 30, 65,
by J. D. Lawrence Jr. 1965, 16p
Grant NsG-710
NASA CR-70177

Descriptors: *Backscatter, *Laser, *Light scattering, *Earth atmosphere.

N66-17291 Field 20E
CFSTI Prices: HC$3.00 MF$0.75
General Telephone and Electronics Labs., Inc., Bayside, N. Y.
INVESTIGATION OF ELECTRO-OPTICAL TECH- NIQUES FOR CONTROLLING THE DIRECTION OF A LASER BEAM. PART ONE-BEAM DEFLECTOR DEVICES. PART TWO-BEAM DEFLECTOR SYSTEMS.
Interim rept.,
by V. J. Fowler, R. Johnson, S. Kapuscienski,J. Schlafer, and P. Weiss. 29 Mar 65, 76p TR-65-722.8
Contract NAS8-11459
NASA CR-68895

Descriptors: *Laser, *Optical tracking, *Beam wave guide, *Electro-optics, *Piezoelectricity.

AD-632 892 See Field 20C

AD-632 998 See Field 20L

AD-633 105 See Field 5A

PB-169 690 See Field 14B

20F. OPTICS

AD-632 676 Field 20F, 20B
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Washington, D. C.
CRYSTALLINE OPTICS. EXPERIMENTAL STUDY OF PLANE ELECTROMAGNETIC WAVES WHICH PROPAGATE THROUGH A HELICOID NEMATIC PLATE,
by M. Jean Billard. May 66, 8p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1P014501A-31B
AERDL T-1844-66, TT 66-61243
Trans. of Academie des Sciences, Paris. Comptes Rendus (France) v261 p939 1965.

Descriptors: (*Electromagnetic waves, Propagation), (*Crystallography, *Optics), Optical phenomena, Wave transmission, Organic compounds, Crystals, France.

Crystalline optics - Experimental study of plane electromagnetic waves which propagate through a helicoid nematic plate. (Author)

AD-632 694 Field 20F, 20D
CFSTI Prices: HC$4.00 MF$0.75
MITHRAS, Inc., Cambridge, Mass.
FLUCTUATING INFRARED RADIATION FROM HOT JETS, BOUNDARY LAYERS AND SHEAR LAYERS.
Final rept., 1 Oct 64-30 Sep 65,
by James Stark Draper. Mar 66, 126p MC-61-5-R6
Contract Nonr-3489 (00)

Descriptors: (*Infrared radiation, *Jets), Turbulence, Temperature, Boundary layer, Noise, Aerodynamic heating, Flight testing.

Four aspects of the near field infrared background noise problem have been investigated: (1) a semi-empirical theory for predicting the levels and spectral distribution of infrared radiation fluctuations from an optically thin hot turbulent flow has been developed, (2) an experimental program has been completed and has confirmed the theory developed by comparing predictions of the broad band rms radiation and spectral radiation with radiometric measurements, (3) a series of flight-regime charts have been derived that show the spectral distribution of the near field radiation, and (4) the dependence of the background noise upon the system optical field has been derived. (Author)

AD-632 799 Field 20F, 7B, 7C, 8G
CFSTI Prices: HC$3.00 MF$0.75
Department of the Navy, Washington, D. C.
METHODS OF SPECTRAL ANALYSIS,
by V. L. Levshin. 1966, 60p Trans-2073
TT 66-61253
Partial trans. of mono. Metody Spektralnogo Analiza, Moscow, 1962.

Descriptors: (*Luminescence, Chemical analysis), USSR, Spectrum analyzers, Quantitative analysis, Chromatographic analysis, Polarographic analysis, Theory, Inorganic compounds, Organic compounds, Rare earth compounds, Tungstates, Molybdates, Uranyl radicals, Vitamins, Hormones, Pigments, Antibiotics, Petroleum, Spectra (Infrared), Spectra (Visible + ultraviolet), X rays, Elementary particles, Gamma rays, Biology, Medicine, Industries, Agriculture, Foods, Archaeology, Criminology.

CONTENTS (Translations of Chapters 20 and 21 of 'Analysis of Luminescence', Section 5, Moscow Univ. Pub. House, 1962). Chapter 20, CHEMICAL ANALYSIS OF LUMINESCENCE: Excitation and recording of radiance during the qualitative and quantitative analysis of luminescence; qualitative and quantitative analyses of luminescence; polarization methods of luminescence analysis; luminescence analyses of organic and inorganic compounds, and minerals and oils. Chapter 21, LUMIN- ESCENCE ANALYSIS OF DETECTION: Detection of invisible radiance; luminescence analyses of detection as applied in biology and medicine, industry, and agriculture and the foodstuff industry; detection of hidden currents; luminescence analysis of detection as applied to paleontology, archaeology, and criminology.

AD-633 011 Field 20F
CFSTI Prices: HC$1.00 MF$0.50
Air Force Materials Lab., Wright-Patterson AFB, Ohio.
MAGNETO-OPTIC ELLIPSOMETRY. PART II. THE EXPERIMENTAL APPARATUS.
Technical rept., Jan-Dec 64,
by Axel M. Stoffel, and Karl Strnat. Mar 66, 23p
AFML-TR-64-419-Pt-2
Proj. AF-7371,
Task 737103

Descriptors: (*Polariscopes, Magneto-optic effect), (*Magneto-optic effect, *Ferromagnetic materials), (*Optics, Magneto-optic effect), Light, Polarization, Refractive index, Optical equipment, Electrooptics.

Identifiers: Ellipsometry, Kerr effect, Polarimeters.

Part I of this report describes the phenomenology and theory of the magneto-optic Kerr effect. This second part describes the design of an electronic polarimeter for the detection and measurement of small changes in the orientation of linearly polarized light with the precision of a few seconds of arc. The procedure for the measurement of the complex index of refraction and the magneto-optic Kerr effect of ferromagnetic materials is discussed. (Author)

AD-633 072 Field 20F
CFSTI Prices: HC$5.00 MF$1.00
Michigan Univ., Ann Arbor. Dept. of Nuclear Engineering.

SCATTERING OF LIGHT FROM ATOMS, MOLECULES AND FREE ELECTRONS, IN GASES AND PLASMAS.
Doctoral thesis,
by Carl M. Penney. Oct 65, 187p Rept. no. 07599-1-T
Contract DA-31-124-ARO (D)-403,
Proj. ORA-07599
AROD 6092:3

Descriptors: (*Light, Scattering), Atoms, Molecules, Electrons, Gases, Plasma physics.

In this dissertation some basic relationships concerning the scattering of light from particles which are very small compared to wavelengths of interest--specifically free electrons, ions, atoms and simple molecules--are examined from a consistent application of quantum perturbation theory to a many body system. Of major concern are particles in gaseous or plasma systems, although many of the results may have broader validity. For the most part attention is confined to nonresonance, linear, single scattering. Higher ordered corrections to the scattering cross section which arise from the variation of the refractive index from unity are neglected and the possible effects of variations in the intensity of incident radiation over distances comparable to wavelengths of interest are not considered in detail. The results obtained under these conditions appear to retain wide limits of applicability are discussed. However, where necessary, all of these conditions can be relaxed to varying degrees through procedures which are mentioned. Among the major results obtained are, first, a consistent and informative derivation of the dependence of light scattering in gases on particle-particle interactions; second, a comparatively simple derivation of the angular distribution of the scattered light; third, detailed relationships between scattering cross sections and oscillator strengths which permit the calculation of Rayleigh and Raman scattering cross sections under appropriate conditions; and fourth, a relationship between familiar quantum expressions for scattering cross sections and refractive indices which is significantly different than the well known classical relationship under conditions for which the classical relationship is often assumed to be valid. (Author)

N66-15666 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Ames Research Center. Moffett Field, Calif.
SOME ASPECTS OF NOISE ANALYSIS OF INTERFEROMETER SPECTROMETERS,
by G. C. Augason, and D. R. Lumb. 1962, 25p
NASA-TM-X-50671

Descriptors: *Fourier transform, *Interferometer, *Noise spectrum, Sampling, *Statistical analysis.

N66-18334 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ENERGY LEVELS IN NEUTRAL ERBIUM,
by W. E. Behring and L. C. Marquet. Jan 65, 10p
NASA-TM-X-56154, X-614-65-21

Descriptors: *Erbium, *Wave number, *Energy level.

AD-632 779 **See Field 20L**

AD-632 918 **See Field 4A**

AD-633 014 **See Field 20E**

AD-633 074 **See Field 20I**

AD-633 272 **See Field 4A**

RFP-673 **See Field 18D**

20G. PARTICLE ACCELERATORS

SLAC-49 **Field 20G, 20H**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
STORAGE RING SUMMER STUDY, 1965, ON INSTABILITIES IN STORED PARTICLE BEAMS.
Summary rept.,
by Burton Richter and Matthew Sands. Aug 65, 80p
Contract AT (04-3)-515

Descriptors: (*Linear accelerators, Particle beams), (*Particle beams, Stability).

AD-632 702 **See Field 6E**

MURA-716 **See Field 18D**

SLAC-53 **See Field 18D**

20H. PARTICLE PHYSICS

AD-632 940 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Physics.
THE POSITIVE-PION - NEGATIVE-PION INTERACTION AS STUDIED IN 12 AND 18 GeV PION-NUCLEON REACTIONS.
Technical rept.,
by L. W. Jones, D. O. Caldwell, B. Zacharov, D. Harting, and E. Bleuler. Apr 66, 25p TR-22, 03106-22-T
Contract Nonr-1224 (23),
Proj. ORA-03106

Descriptors: (*Pions, *Pair production), (*Meson reactions, Pair production), Nuclear particles, Meson bombardment, Field theory, Nuclear cross sections, Switzerland.

From a study of peripheral interactions wherein a negative pion of 12 or 18 Gev/c incident on a nucleon produced a pair of high-momentum pions, the pion-pion s-wave interaction was deduced. A pion-pion cross section falling smoothly from 50 mb (300 MeV) to 20 mb (600 MeV) was observed. The forward-backward assymmetry was negative for low dipion masses. (Author)

AD-633 298 **Field 20H, 20C**
CFSTI Prices: HC$1.00 MF$0.50
High Energy Physics Lab., Stanford Univ., Calif.
A TEST OF QUANTUM ELECTRODYNAMICS BY ELECTRON-ELECTRON SCATTERING,
by W. C. Barber, B. Gittelman, G. K. O'Neill, and B. Richter. Apr 66, 10p HEPL-438, SLAC-PUB-194
Contracts Nonr-225 (67), Nonr-1858 (39)
Contract AT (04-3)-515. To be submitted to Phys. Rev. Letters.

Descriptors: (*Field theory, *Electrons), (*Differential cross sections, Electrons), Scattering, Tests.

A test of quantumelectrodynamics was made by studying the angular distribution of electrons scattered in the reaction e - + e - yields e - + e -. A center of mass energy of 600 MeV was made possible by storage rings each containing circulating electron beams of 300 MeV. (Author)

ANL-7095 **Field 20H, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
DIFFERENTIAL CROSS SECTIONS OF THE 9 BE (D,N)10 B REACTION,
by S. G. Buccino and A. B. Smith. Sep 65, 13p
Contract W-31-109-eng-38

Descriptors: (*Differential cross section, Boron), (*Beryllium, Nuclear reactions).

IDO-17083 **Field 20H, 18K**
CFSTI Prices: HC$3.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
MEASUREMENT OF THE ABSOLUTE VALUE OF ETA FOR 233 U, 235 U AND 239 PU USING MONOCHROMATIC NEUTRONS,
by J. R. Smith, S. D. Reeder, and R. G. Dluharty. Feb 66, 51p
Contract AT (10-1)-205

Descriptors: (*Fission neutrons, Absorption), (*Reactor theory, Fission neutrons).

LA-3463 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
NEUTRON CAPTURE CROSS SECTIONS OF SOME RARE EARTH NUCLEI,
by George I. Bell. Jan 66, 16p
Contract W-7405-eng-36

Descriptors: (*Neutron cross sections, Rare earths), (*Rare earths, Nuclear reactions).

NBS Misc. Publ. 277 **Field 20H**
CFSTI Prices: HC$0.55 MF$0.75
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
PHOTONUCLEAR DATA INDEX.
1 Apr 66, 102p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.55.

Descriptors: (*Photonuclear reactions, Indexes), Bibliographies, Tables.

An index to experimental data on photonuclear reactions is presented. Organized by element and isotope, each entry in the index supplies quantitative information for a specific reaction on the ranges of excitation energy, source energy, detected particle energy, and emission angles for reaction produced covered in each reference. Information is also given on the type of measurement and detector used. (Author)

N66-15536 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.75
Bern Univ. (Switzerland).
SPALLATION, FISSION AND NEUTRON CAPTURE ANOMALIES IN METEORITIC KRYPTON AND XENON,
by P. Eberhardt, J. Geiss, and K. Marti. Nov 65, 63p

Descriptors: *Krypton, *Xenon, *Meteoritic composition, *Neutron bombardment, *Nuclear reaction, *Spalling.

N66-15568 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.50
Laboratoire de Physique Theorique et Hautes Energies, Orsay (France).
FINAL STATE COULOMB INTERACTION IN QUASI -ELASTIC NEUTRINO SCATTERING ON NUCLEI,
by C. A. Piketty. Nov 65, 59p

Descriptors: *Muon, *Coulomb potential, *Neutrino, *Nuclear scattering.

N66-15769 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Bellcomm, Inc., Washington, D. C.
SOLAR COSMIC RAY EVENTS,
by R. H. Hilberg. 1 Nov 65, 37p TR-65-340-1
Contract NASw-417
NASA CR-69542

Descriptors: *Solar cosmic ray, *Charged particle, *Earth radiation, *Particle flux, *Radiation hazard.

N66-16698 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C.
AN ELECTRIC QUADRUPOLE TRANSITION IN THE A1PI-X1SIGMA SYSTEM OF CO,
by J. D. Simmons and S. G. Tilford. 30 Nov 65, 20p NBS-9008
NASA Order-R-64
NASA CR-70045

Descriptors: *Carbon monoxide, *Quadrupole, *Absorption band, *Electric dipole, *Electron transition.

N66-16982 Field 20H
CFSTI Prices: HC$3.00 MF$0.50
Florida Univ., Gainesville.
STUDIES IN PERTURBATION THEORY. XI. LOWER BOUNDS TO ENERGY EIGENVALUES, GROUND STATE AND EXCITED STATES,
by P. O. Lowdin. 15 Jun 64, 51p TN-121
Grant NsG-512
NASA CR-70210

Descriptors: *Hilbert space, *Eigenvalue, *Hamiltonian, *Operational calculus.

N66-17320 Field 20H
CFSTI Prices: HC$3.00 MF$0.75
Columbia Radiation Lab., New York.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM.
Quarterly progress rept. 16 Jun - 15 Sep 65,
by R. Novick. 15 Sep 65, 82p Rept. no. 11
Grant NSG-360, NSG-442
NASA CR-70391
Prepared in cooperation with Dept. of the Army Contract DA-28-043-AMC-00099 (E).

Descriptors: *Astronomy, *Nuclear physics, *Optical maser, *Solid state physics, *Radioactive element.

N66-17354 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
State Univ. of Iowa, Iowa City.
OBSERVATIONS WITH UNIVERSITY OF IOWA EQUIPMENT ON MARINER IV, FEBRUARY - MAY 1965 (PRELIMINARY),
by L. A. Frank, H. K. Hills, S. M. Krimigis, and J. A. Van Allen. 24 May 65, 19p Rept. no. 65-15
Contracts NAS7-100, NsG-233-62
NASA CR-70375

Descriptors: *Detector, *Mariner IV space probe, *Proton impact, *Solar cosmic ray.

N66-17566 Field 20H
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
THE LEWIS PROTON SHIELDING CODE,
by R. I. Hildebrand and H. E. Renkel. 1966, 89p
NASA-TM-X-52166

Descriptors: *Computer program, *Particle intensity, *Proton irradiation, *Radiation shielding.

N66-17569 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MONTE CARLO INTERPRETATION OF SPHERE TRANSMISSION EXPERIMENTS FOR AVERAGE CAPTURE CROSS SECTIONS AT 24 KE V,
by D. Bogart and T. T. Semler. 1966, 31p NASA-TM-X-52173
Presented at Conf. on Neutron Cross Sect. Technol., Washington, Mar 22-24 1966 sponsored by Am. Phys. Soc., NBS and AEC.

Descriptors: *Monte Carlo method, *Neutron cross section, *Spherical shell.

N66-17774 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
BORON CROSS SECTIONS AS A SOURCE OF DISCREPANCY FOR CAPTURE CROSS SECTIONS IN KE V REGION,
by D. Bogart. 1966, 24p NASA-TM-X-52162
Presented at Conf. on Neutron Cross Sect. Technol., Washington, D. C., Mar 22-24, 1966, sponsored by Am. Phys. Soc., NBS, and AEC.

Descriptors: *Gold, *Neutron cross section, *Boron, *Neutron flux.

N66-17784 Field 20H
CFSTI Prices: HC$6.00 MF$1.75
LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
CATALOGUE OF SOLAR ACTIVITY DURING 1960-1963, VOLUME V,
by H. Dodson-Prince, E. R. Hedeman, and F. C. Jonah. 21 Jun 65, 300p Rept. no. 00.654
Contract NAS9-2469
NASA CR-65221

Descriptors: *Solar activity, *Solar radio burst, *Sunspot, *Geomagnetic storm, *Solar flare.

N66-17785 Field 20H
CFSTI Prices: HC$5.00 MF$1.00
LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
CATALOGUE OF SOLAR ACTIVITY DURING 1958, VOLUME III,
by H. Dodson-Prince, E. R. Hedeman, and F. C. Jonah. 28 Aug 64, 166p Rept. no. 00.503
Contract NAS 9-2469
NASA CR-65219

Descriptors: *Ephemeris, *Radio emission, *Solar flare, *Balloon flight, *Geomagnetic storm.

N66-18059 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
Institute of Nuclear Research, Warsaw (Poland).
NUMERICAL SOLUTIONS OF THE SUPERCONDUCTIVITY EQUATIONS FOR ODD-A NUCLEI IN THE RARE-EARTH REGION,
by M. Y. M. Hassan, Z. Skladanowski, and Z. Szymanski. Feb 65, 43p INR-602 (VII)PH

Descriptors: *Superconductivity, *Even-even nucleus, *Rare earth.

N66-18073 Field 20H
CFSTI Prices: HC$5.00 MF$1.25
LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
CATALOGUE OF SOLAR ACTIVITY DURING 1957,
by H. Dodson-Prince, E. R. Hedeman, and F. C. Jonah. 28 Aug 64, 166p Rept. no. 00-538
Contract NAS9-2469
NASA CR-65218

Descriptors: *Solar flare, *Geomagnetic storm, *Solar activity, *Solar radio burst, *Sunspot.

N66-18124 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
Institute of Nuclear Research, Warsaw (Poland).
SOLUTION OF THE TIME DEPENDENT TRANSPORT EQUATION FOR A NON-UNIFORM SLAB,
by J. Mika. Jun 65, 28p INR-637 (IX-A)R

Descriptors: *Transport, *Infinite solid, *Initial value problem, *Neutron scattering, *Time dependency.

N66-18125 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
Institute of Nuclear Research, Warsaw (Poland).
THE SECOND VIBRATIONAL STATE OF EVEN-EVEN SPHERICAL NUCLEI,
by D. Chlebowska, and M. Zielinska. Apr 65, 27p INR-620 (VII)PH

Descriptors: *Even-even nucleus, *Excited state, *Green function, *Triplet state.

N66-18306 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
College of William and Mary, Williamsburg, Va.
A NEW MEASUREMENT OF THE LIFETIME OF THE POSITIVE PION,
by M. Eckhause, R. J. Harris, Jr., W. B. Shuler, R. T. Siegel, and R. E. Welsh. 1966, 6p WM-3
Grant NsG-567
NASA CR-70754

Descriptors: *Lifetime, *Particle decay, *Time measurement, *Digital technique, *Pion.

N66-18362 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
PARTIAL WAVE CALCULATION OF THE DIATOMIC MOLECULE (HE H) PLUS PLUS,
by H. Rabinovich. 1965, 38p NASA-TM-X-56260

Descriptors: *Hydride, *Diatomic molecule, *Helium, *Schroedinger equation.

N66-18396 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
COUPLING CONSTANTS OF SPIN-TWO MESONS WITH TWO PSEUDOSCALAR MESONS,
by K. V. Vasavada. Nov 65, 28p NASA-TM-X-55398, X-641-65-464

Descriptors: *Coupling constant, *Meson, *Quantum number.

ORNL-3746 Field 20H, 12A
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
A GENERAL CATEGORY OF SOLUBLE NUCLEON-MESON CASCADE EQUATIONS,
by F. S. Alsmiller. Dec 63, 36p
Contract W-7405-eng-26

Descriptors: (*Nucleons, Integral equations), (*Mesons, Integral transforms).

PB-169 539 Field 20H, 18D
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DES TRANSITIONS BETA UNE FOIS INTERDITES. CAS DE 42K ET 86RB (Contribution to the Study of Once-Forbidden Beta Transitions. Case of 42K and 86Rb).
Doctoral thesis in French,
by Stephane Andre. 1966, 87p CEA-R-2964
Text in French; Attached Summary in English.

Descriptors: (*Nuclear energy levels, Selection rules), (*Beta-ray spectrum, Measurement), (*Potassium, Nuclear energy levels), (*Rubidium, Nuclear energy levels), Beta decay, Hamiltonian, Nuclear radiation spectrometers, Coincidence counting, France.

An apparatus was developed for studying the exact shape of the spectra of beta transitions which lead to an excited state of the final nucleus, using a Siegbahn-Slatis beta spectrometer. In particular the beta spectrum of the $2^- + 0 > 2^+$ transition of K42 has been measured; a considerable deviation

was found with respect to the statistical shape. The six elements of the nuclear matrices for this transition have been determined using this measurement and other results. It is shown that it cannot be explained by a pure f7/2<0d3/2 transition. (Author)

PB-169 540 **Field 20H, 18D**
CFSTI Prices: HC$5.60 MF$0.50
Commissariat a l'Energie Atomique, Cadarache (France). Centre d'Etudes Nucleaires.
SUR LA SOLUTION DE QUELQUES PROBLEMS DE DIFFUSIONS MULTIPLES PAR LA METHODE DE MONTE-CARLO (On the Solution of a Few Problems of Multiple Scattering by Monte-Carlo Method),
by Jean-Claude Bluet. Feb 66, 53p CEA-R-2971
Text in French; Attached Summary in English.

Descriptors: (*Nuclear scattering, Monte Carlo method), (*Monte Carlo method, Nuclear scattering), Elastic scattering, Neutron reactions, Sodium, Neutron cross sections, Sodium compounds, Iodides, Neutron flux, Scintillation counters, Neutron detectors, Collimators, Programming (Computers), France.

Three problems of multiple scattering arising from neutron cross sections experiments, are reported here. The common hypothesis are: (1) elastic scattering is the only possible process, (2) angular distributions are isotropic, (3) losses of particle energy are negligible in successive collisions. In the three cases practical results, corresponding to actual experiments are given. Moreover the results are shown in more general way, using dimensionless variable such as the ratio of geometrical dimensions to neutron mean free path. The FORTRAN codes are given together with to the corresponding flow charts, and lexicons of symbols. (Author)

AD-632 795 **See Field 12B**

AD-632 806 **See Field 9C**

AD-632 850 **See Field 7D**

AD-633 079 **See Field 3B**

AD-633 252 **See Field 18D**

AD-633 280 **See Field 20I**

AD-633 426 **See Field 9B**

MIT-2098-99 **See Field 3B**

ORNL-3877 **See Field 9B**

ORNL-3881 **See Field 9B**

SLAC-49 **See Field 20G**

SLAC-53 **See Field 18D**

20I. PLASMA PHYSICS

AD-632 670 **Field 20I, 20C**
CFSTI Prices: HC$3.00 MF$0.75
New Mexico State Univ., University Park. Research Center.
AN EXPERIMENTAL STUDY OF RADIO-FREQUENCY PLASMOIDS.
Interim rept.,
by John R. Trimmier. Apr 66, 84p
Contract Nonr-3531 (03)

Descriptors: (*Gas discharges, Radiofrequency), (*Plasma physics, Gas discharges), (*Probes (Electromagnetic), Plasma physics), Ion beams, Metals, Probes, Langmuir probes, Gas ionization, Electrical properties.

Identifiers: Radio-frequency plasmoids.

The primary objective was to obtain information about the average electrical potential distributions within rf plasmoid discharges by using a positive ion beam, and its deflections, as a probe which would introduce only small perturbations into the discharge. A secondary aim was the correlation of ion beam derived data with metallic probe data--one objective being the evaluation of the validity of data derived from metallic probes in the presence of highly non-Maxwellian electron (and, perhaps, ion) energy distributions. A third and, somewhat accidental, investigation covered the behavior of electrode-to-chamber voltages developed by the discharges. All of these investigations are discussed in some detail.

AD-632 697 **Field 20I, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Plasma Physics Lab.
ONSET OF TURBULENCE IN THE POSITIVE COLUMN.
Research note,
by F. C. Hoh. Feb 66, 14p D1-82-0512

Descriptors: (*Turbulence, Helixes), (*Plasma medium, Turbulence), Stability, Stabilization systems, Electric fields, Differential equations.

A discussion is given of a physical stabilization mechanism of the helical instability of the positive column in a longitudinal magnetic field due to quasi-linear effects. The quasi-linear steady state, consisting of a density helix rotating around the axis, is then perturbed and a chain of linearized differential equations results. When this state next becomes unstable, a coupled set of helical modes with the same growth rate are excited simultaneously, thus leading to the onset of turbulent behavior. Finally, the boundary condition and the corresponding expansion of the eigenfunction of the linearized problem, which was arbitrarily chosen previously, is reconsidered. (Author)

AD-632 701 **Field 20I**
CFSTI Prices: HC$3.60 MF$0.50
Kiel Univ. (West Germany). Institut fuer Experimentelle Physik.
QUANTITATIVE SPECTROSCOPY TEMPERATURE DETERMINATION IN PLASMAS.
Technical rept.,
by W. Botticher, H. Manthey, and J. Rath. 1965, 33p
Grant AF-EOAR-54-63
See also AD-404 920.

Descriptors: (*Plasma medium, Temperature), (*Spectroscopy, Temperature), High-temperature research, Blackbody radiation, Sparks, Electric discharges, Determination, Magnetic pinch, High-pressure research, Argon, West Germany, Spectra (Visible + ultraviolet).

Fast rising spark discharges in high pressure gas and in air and their qualification as standard light sources have been investigated. Two special types are described: A spark for exposure times in the microsecond-and one in the msec- range. The radiation was found to be continuous and reproducible, coming from an optically thick region. The micosec-spark has a black body temperature of 35000K, the misec-spark one of 9000K. (Author)

AD-632 782 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
STABILITY OF A UNIFORM PLASMA COMPOSED OF STREAMS IN THE ABSENCE OF AN EXTERNAL FIELD.
Research rept.,
by Hiromu Momota. Feb 66, 23p IPPJ-45

Descriptors: (*Plasma physics, Stability), Temperature.

By means of the collisionless Boltzmann equation and the Maxwell equations with no external field, it is shown that a plasma composed of streams is necessarily unstable for a transverse oscillation propagating perpendicularly to the streams. The instability is attributed to the bunching of the electric current density, corresponding to the bunching of the charge density in the usual two-stream instability which is accompanied by the excitation of a longitudinal oscillation. When the thermal motion of the particles in a stream is taken into account, the instability can be suppressed due to the thermal diffusion of the bunched current. For a transverse oscillation, a criterion of the stability is obtained. (Author)

AD-632 785 **Field 20I, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
RESONANCES OF RADIO FREQUENCY PROBE IN A PLASMA.
Research rept.,
by Hiroyuki Ikezi and Kazuo Takayama. Mar 66, 24p IPPJ-48

Descriptors: (*Probes (Electromagnetic), *Plasma physics), (*Radiofrequency, Probes (Electromagnetic)), Electrical impedance, Resonant frequency, Plasma sheath.

The RF probe experiment is carried out by the use of a low density plasma, and resonances of the probe impedance are studied. We observed two resonances in a frequency range between the sheath-plasma resonance and the plasma frequencies are observed. A mechanism of the additional resonances is discussed. It is shown that finite electron temperature introduces resonances in addition to the sheath-plasma resonance. Choosing some artificial density distributions in front of the probe, the frequency dependence of the resonances is explained qualitatively. (Author)

AD-633 026 **Field 20I, 20D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
TABULATED SOLUTIONS OF THE EQUATION GOVERNING MAGNETOHYDRODYNAMIC FLOW WITH ALIGNED VELOCITY AND MAGNETIC FIELDS,
by S. Berger, S. Genensky, A. Madansky, and M. Ryan. Apr 66, 49p RM-4847-ARPA
Contract SD-79, ARPA Order-189-1

Descriptors: (*Magnetohydrodynamics, equations of motion), Gas flow, Fluid mechanics, Magnetic fields, Partial differential equations, Numerical analysis, Plasma physics.

When an infinitely conducting gas flows in a plane in such a way that the velocity and magnetic fields are everywhere aligned, then the governing magnetohydrodynamic equations may be linearized by transforming to the hodograph plane. The problem may then be reduced to the solution of a second-order linear partial differential equation for the stream function. This Memorandum presents tabulated numerical solutions of this equation; they should be of use to workers in the area of magnetohydrodynamics. (Author)

AD-633 027 **Field 20I, 20D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
OUTFLOW OF A CONDUCTING GAS JET WITH ALIGNED MAGNETIC FIELD FROM A RECTANGULAR CHANNEL,
by S. A. Berger. Apr 66, 42p RM-4884-ARPA
Contract SD-79, ARPA Order-189-1

Descriptors: (*Gas flow, *Magnetohydrodynamics), Jets, Fluid mechanics, Magnetic

fields, Differential equations, Numerical analysis, Plasma physics.

The flow of an infinitely conducting gas with aligned velocity and magnetic fields out of a rectangular channel of finite width can be solved exactly by transformation to the hodograph plane. This solution was presented in an earlier RAND Memorandum. The present work contains the calculation of the coefficient of contraction of the jet for various values of the basic parameters of the flow. (Author)

AD-633 074 **Field 20I, 20J, 20F**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Nuclear Engineering.
AN ELEMENTARY REVIEW OF THE SCATTERING OF PHOTONS BY HIGHLY IONIZED PLASMAS.
Technical rept.,
by K. R. Osborn. Feb 66, 35p Rept. no. 07599-3-T
Contract DA-31-124-ARO (D)-403,
Proj. ORA-07599
AROD 6092:4

Descriptors: (*Photons, Scattering), (*Plasma physics, Photons), Kinetic theory, Quantum mechanics, Statistical mechanics.

AD-633 101 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Inst. for Plasma Research.
BIBLIOGRAPHY OF STANFORD REPORTS, PAPERS AND CONFERENCE PRESENTATIONS ON PLASMA PHYSICS.
Feb 66, 66p SU-IPR-52

Descriptors: (*Plasma physics, *Bibliographies), Scientific research, Reports, Symposia.

Contents: Publications since formation of Institute for Plasma Research. Publications before formation of Institute for Plasma Research: Aeronautics and Astronautics Department, Mechanical Engineering Department, Microwave Laboratory, Stanford Electronics Laboratory.

AD-633 280 **Field 20I, 9A, 9E, 20H**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Corp., El Segundo, Calif. Technical Operations.
A LOW INDUCTANCE GASEOUS SWITCH TUBE.
Technical documentary rept.,
by V. Josephson. Dec 65, 11p TDR-669 (6550-10)-1
Contract AF 04 (695)-669
SSD TR-66-72

Descriptors: (*Electronic switches, *Discharge tubes), Hydrogen, Electron tubes, Switching circuits, Inductance, Gas discharges, Plasma physics, Thermonuclear reactions, Control systems.

A low inductance gaseous switch tube has been designed and tested which permits high current (>150,000 amp) switching of power at potentials up to 20 kv without deterioration of electrodes due to current pinching. The switch is so designed that triggering is accomplished externally with very low (<0.1 micro sec) time jitter over a wide range (5 - 20 kv) of operating voltages. (Author)

AD-633 327 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Austin. Dept. of Physics.
HELICAL ANOMALIES IN RF PLASMAS.
Final rept., 1 Apr 63-31 Mar 66,
by Hans Schluter. 31 Mar 66, 4p
Grant DA-ARO (D)-31-124-G348
AROD 4159:4

Descriptors: (*Plasma physics, Radio-frequency), Analysis.

N66-15412 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Comitato Nazionale per l'Energia Nucleare, Frascati (Italy).
ON THE GENERALITY OF THE STABILITY CRITER- ION AGAINST THE TRANSVERSE WALL INSTABILITY OF RELATIVISTIC BEAMS,
by E. Ferlenghi. 6 Oct 65, 11p LNF-65/34, Rept. no. 42

Descriptors: *Relativistic plasma, *Vacuum chamber, *Particle accelerator, *Plasma instability.

N66-15517 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
ION CYCLOTRON RESONANCE HEATING OF AN INHOMOGENEOUS PLASMA COLUMN,
by M. Tanaka. Sep 65, 34p IPPJ-37

Descriptors: *Ion cyclotron, *Plasma cylinder, *Resonance effect.

N66-15523 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
MEASUREMENT OF THE EXCITATION FUNCTION OF N PLUS SUB 2 FIRST NEGATIVE BANDS BY ELECTRON IMPACT,
by S. Hayakawa, T. Kumazaki, H. Nishimura, andM. Otsuka. Sep 65, 24p IPPJ-42

Descriptors: *Electron bombardment, *Excitation, *Gas pressure, *Nitrogen ion.

N66-16722 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
AVCO-Everett Research Lab., Everett, Mass.
THE PRODUCTION OF BE V POTENTIAL WELLS,
by G. S. Janes, R. H. Levy, and H. E. Petschek.Jun 65, 13p AMP-166
Contracts AF 49 (638)-1553, NASw-1101
NASA CR-70015

Descriptors: *Electron cloud, *Magnetic field, *Potential field, *Well.

AD-632 783 **See Field 20N**

AD-632 784 **See Field 12A**

AD-632 794 **See Field 20N**

AD-632 806 **See Field 9C**

AD-632 818 **See Field 20D**

AD-632 892 **See Field 20C**

AD-632 897 **See Field 20D**

AD-633 251 **See Field 4A**

LA-3368 **See Field 10B**

TID-21380 **See Field 17B**

20J. QUANTUM THEORY

AD-632 807 **Field 20J, 7D**
CFSTI Prices: HC$1.00 MF$0.50
American Meteorological Society, Boston, Mass.
ANGULAR INTEGRATION OF FEYNMAN DIAGRAMS IN THE FIELD-THEORETIC PERTURBATION THEORY OF ATOMS,
by A. B. Bolotin, I. B. Levinson, and V. V. Tolmachev.Mar 66, 16p T-R-543
Contract AF 19 (628)-3880
TT 66-61254
Integrirovanie ' Feinmanovskikh Diagramm po Uglovym Peremennym v Polevoi Forme Teoriya Vozmushcheniya dlya Atomov, trans. of Lietuvos Fizikos Rinkinys (Lithuanian SSR) v4 n1 p25-33 1964.

Descriptors: (*Perturbation theory, Integration), (*Field theory, Integration), Atoms, Molecules, Momentum, Graphics, USSR.

Identifiers: Feynman diagrams.

The field-theoretic perturbation theory for the many-electron problem in atomic problems is developed further. The radial and angular parts are separated in the contribution from the quadruple vertex. The angular part is expressed through j-coefficients. With the resulting formula, the angular and radial parts of the Feynman diagrams for the first- and second-order energy shifts are separated directly from the quadruple vertex. General rules are formulated for the composition of Feynman diagrams with separated radial and angular parts. The momentum diagrams for the angular parts of the Feynman diagrams, which are diagrams for the j-coefficients, are completely similar to the Feynman diagrams themselves. (Author)

AD-632 843 **Field 20J, 3B**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Theoretical Physics, Stanford Univ., Calif.
COMPARISON OF THEORY AND OBSERVATION IN GENERAL RELATIVITY,
by L. I. Schiff. 1966, 20p ITP-181
Contract AF 49 (638)-1389
Presented at the American Mathematical Society 1965 Summer Seminar on Relativity and Astrophysics.

Descriptors: (*Relativity theory, *Astrophysics), Field theory, Gyroscopes, Gravity, Radar reflections, Extraterrestrial radio waves, Tensor analysis, Tests.

Identifiers: Lectures.

The report consists of an abbreviated version of two lectures whose purpose was: (a) to stress the care that must be taken in comparing predictions of general relativity with observations; and (b) to describe a quantitative method for determining the extent to which one particular but important aspect of the theory is being tested.

AD-632 968 **Field 20J, 20K**
CFSTI Prices: HC$3.00 MF$0.75
Lincoln Lab., Mass. Inst. of Tech., Lexington.
A NEW FORMULATION OF PARTICLE MECHANICS,
by R. T. Prosser. 1966, 60p JA-2278
Contract AF 19 (628)-5167
ESD TR-66-172
Memoirs of the American Mathematical Society, Number 61.

Descriptors: (*Mechanics, *Particles), Equations of motion.

It is the purpose of this paper to provide an abstract formulation of the concept of a mechanical system containing both the classical and quantum formulations, and to derive its most elementary properties. (Author)

AD-633 056 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Uppsala Univ. (Sweden). Quantum Chemistry Group.
SECOND QUANTIZATION OF AN ARBITRARY OPERATOR,
by Donald H. Kobe. 1 Oct 65, 12p Scientific-52, Preprint-158
Contract AF 61 (052)-701
ARL 66-0085

Descriptors: (*Fermions, Operators (Mathematics)), (*Bosons, Operators (Mathematics)), Wave functions, Sweden.

Identifiers: Hilbert space.

The representation of an arbitrary operator in second quantization is obtained for both fermion and boson systems by using the isomorphism between second quantization and a graded configuration space. (Author)

AD-633 378 **Field 20J**
New York Univ., N. Y.
DISPROFF OF SENITZKY'S 'FUNDAMENTAL THEOREM IN QUANTUM OPTICS'.
Revised ed.,
by A. E. Glassgold, and Dennis Holliday. 8 Oct 65, 2p
Grant DA-ARO (D)-31-124-G523
AROD 4614:6
Prepared in cooperation with RAND Corp., Santa Monica, Calif. Revision of manuscript received 23 Aug 65.

Descriptors: (*Quantum mechanics, Theorems), (*Field theory, Theorems), Physics, Theory.

Senitzky's theorem implies that the classical versus quantum behavior of an electromagnetic field depends upon the causal relationship between the source of the field and possible field measurements. This result contradicts the fact that a field can be excited to an arbitrary (quantum statistical) state by a source which can then be decoupled from the field before any measurements are performed. Since the measurements would then not be able to affect the decoupled source dynamically, Senitzky's theorem implies that mere decoupling of the source from the field forces the field to become classical. The proof of Senitzky's theorem and its application to quantum optics is based on the incorrect assumption that, once two systems no longer interact, a measurement involving one system cannot influence the statistical properties of the other system. This assumption ignores the correlations which can be established between two systems through their past interaction.

N66-16696 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Maryland Univ., College Park. Dept. of Physics and Astronomy.
TAUB- NUT SPACE AS A COUNTEREXAMPLE TO ALMOST ANYTHING.
Technical rept. no. 529,
by C. W. Misner. Nov 65, 22p
Grant NsG-436
NASA CR-70033
Presented at the Am. Math. Soc. 1965 Summer Seminar on Relativity and Astrophys., Ithaca, N. Y., Aug. 1965.

Descriptors: *Classical mechanics, *Differential equation, *Einstein equation.

N66-18395 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EXCITATION OF ATOMIC HYDROGEN BY PROTONS,
by I. M. Cheshire and E. C. Sullivan. Nov 65, 11p
NASA-TM-X-55401, X-641-65-474

Descriptors: *Nonadiabatic theory, *Proton impact, *Atomic collision, *Excitation, *Hydrogen atom.

TID-20517 **Field 20J, 20C**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
PERTURBATION THEORY OF PARTIAL WAVE AMPLITUDES,
by Norman Howard Fuchs. 13 Apr 64, 29p
Contract AT (30-1)-2098

Descriptors: (*Perturbation theory, Quantum mechanics), (*Bosons, Perturbation theory).

AD-632 935 **See Field 20L**

AD-633 074 **See Field 20I**

20K. SOLID MECHANICS

AD-466 156 **Field 20K**
CFSTI Prices: HC$5.60 MF$0.75
Aerospace Corp., El Segundo, Calif. Technical Operations.
STRESSES AND STRAINS IN MULTI-LAYER ANISOTROPIC HOLLOW CYLINDERS,
by Norman N. Au. 30 Jun 65, 60p TDR-469 (5560-30)-4
Contract AF 04 (695)-469
SSD TR-65-59

Descriptors: (*Mechanical properties, Cylindrical bodies), (*Cylindrical bodies, Mechanical properties), Anisotropy, Stresses, Elasticity.

Equations for elastic stresses and strains due to uniform internal and external pressures and an arbitrary radial temperature gradient are derived for a long, hollow, anisotropic, N-layer concentric circular cylinder in generalized plane strain. The anisotropic cylinder is made of materials having three mutually orthogonal planes of elastic symmetry, and the principal axes of anisotropy coincide with the principal axes of the cylinder. The derivation considers the composite cylinder to be made of materials that are layer-wise elastic, homogeneous, and anisotropic. The equations are written in such forms that they are readily applicable, with minor modifications, to the isotropic and monotropic cylinders. Two end conditions are treated: the cylinder with free ends, and the cylinder with a prescribed end force. Emphasis is placed on the analysis of practical configurations in which cylinders of anisotropic, monotropic, and isotropic materials are bonded concentrically in any order to one another. The important effects of anisotropy together with the errors that can result by assuming isotropy for an anisotropic material are discussed. The requirements on physical properties of materials for the purpose of assessing structural integrity of a given design are also delineated. (Author)

AD-466 352 **Field 20K, 12A**
CFSTI Prices: HC$2.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
UPPER AND LOWER BOUNDS FOR THE FREQUENCIES OF RECTANGULAR CLAMPED PLATES.
Technical memo.,
by David W. Fox, James T. Stadter, and Norman W. Bazley. May 65, 25p TG-626
Contract NOw-62-0604-c
Prepared in cooperation with Battelle Memorial Inst., Geneva (Switzerland).

Descriptors: (*Vibration, Boundary value problems), (*Boundary value problems, Vibration), Rectangular bodies, Metal plates, Panels (Structural), Numerical analysis.

The authors apply a recently developed method for lower bounds and the Rayleigh-Ritz procedure for upper bounds to the estimation of the frequencies of free vibration of clamped rectangular plates. The applicability of the lower bound procedure is demonstrated and calculations are presented for a symmetry class for rectangular plates and for a sub-symmetry class for square plates. The resulting bounds represent improvements over previously published rigorous results and demonstrate the utility of the lower bound method. (Author)

AD-467 992 **Field 20K, 12A**
CFSTI Prices: HC$3.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
UPPER AND LOWER BOUNDS FOR THE FREQUENCIES OF RECTANGULAR CANTILEVER PLATES.
Technical memo.,
by Norman W. Brazley, David W. Fox, and James T. Stadter. Jul 65, 34p TG-705
NOw-62-0604-c

Descriptors: (*Vibration, Boundary value problems), (*Cantilever beams, Vibration), (*Boundary value problems, Vibration), Numerical analysis.

The authors use a recently developed procedure for lower bounds and the Rayleigh-Ritz procedure for upper bounds to estimate frequencies of free vibration of thin rectangular cantilever plates. The applicability of the lower bound procedure is demonstrated, and calculations are given for a symmetry class of normal modes. The lower bounds seem to be the first rigorously obtained for this problem. The upper bounds are improvements over previously published rigorous results. (Author)

AD-632 829 **Field 20K, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
AN INVESTIGATION OF THE AEROELASTIC STABILITY OF THIN CYLINDRICAL SHELLS AT TRANSONIC MACH NUMBERS.
Technical rept. for 27 Dec 65-10 Jan 66,
by T. M. Perkins and T. R. Brice. May 66, 38p
AEDC-TR-66-93
Contract AF 40 (600)-1200,
Projs. AF-7063, ARO-PBO504
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Aeroelasticity, *Structural shells), (*Cylindrical bodies, Aeroelasticity), Stability, Flutter, Transonic characteristics.

Static pressure and boundary-layer data were obtained over a rigid pressure shell at Mach numbers from 1.20 to 1.50 and Reynolds numbers from 1.04 to 4.20 x 10 to the 6th/ft in the 16-ft transonic tunnel. These data were obtained with and without addition of air into the boundary layer through a circular slot upstream of the test shell. Flutter characteristics of thin cylindrical shells were obtained at Mach numbers of 1.20 and 1.50 with and without boundary-layer blowing and shell axial loading. Spirally traveling waves appeared on three of the shells just prior to divergent flutter, which was initiated by reducing shell cavity pressure. (Author)

AD-632 920 **Field 20K, 1B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
A PRELIMINARY STUDY OF THE BUCKLE CONTOURS IN AN AXIALLY COMPRESSED CIRCULAR CYLINDRICAL SHELL,
by W. H. Horton, and R. W. Johnson. Dec 65, 29p
SUDAER-253
Contract DA-44-177-AMC-115 (T)

Descriptors: (*Buckling (Mechanics), *Structural shells), Cylindrical bodies, Aluminum, Plasticity, Experimental data.

The paper presents experimentally determined contours at initial buckling for an aluminum right circular cylindrical shell of 3.35 inches of diameter and 0.0025 inches wall thickness loaded in axial compression. It shows that when the buckle amplitude is only 2.8 times the wall thickness there is strong evidence of plastic deformations. (Author)

AD-632 921 **Field 20K, 1C**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
THE STABILITY OF THIN-WALLED UNSTIFFENED CIRCULAR CYLINDRICAL SHELLS UNDER NONUNIFORMLY DISTRIBUTED AXIAL LOAD,

by W. H. Horton, and J. W. Cox. Feb 65, 91p
SUDAER-220
Contracts DA-44-177-AMC-115 (T), DA-44-177-AMC-258 (T)
Prepared for presentation at the ASME Aviation and Space Conference 1965, Los Angeles, Calif., 16-18 Mar 65.

Descriptors: (*Structural shells, *Stability), Loading (Mechanics), Buckling (Mechanics), Tests.

This paper presents an experimental study of the stability of thin-walled unstiffened circular cylindrical shells under nonuniformly distributed axial load. It shows that such shells will buckle when the stress at any point on their surface reaches the critical value for uniform axial compression. It is furthermore demonstrated that statistical data with regard to shell buckling can be obtained from limited tests on single specimens.

AD-632 922 **Field 20K, 1B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
NONSYMMETRIC BUCKLE PATTERNS IN PROGRESSIVE PLASTIC BUCKLING,
by W. H. Horton, S. C. Bailey, and A. Edwards. 1966, 50p
Contracts DA-44-177-AMC-115 (T), AF 49 (638)-1495
Presented at the SESA Denver Meeting 1965 and to be pub. by the SESA in Experimental Mechanics.

Descriptors: (*Buckling (Mechanics), *Structural shells), (*Plasticity, Buckling (Mechanics)), Cylindrical bodies, Experimental data.

This paper presents the results of a series of experiments on the progressive plastic buckling of cylindrical shells under axial compressive load. It shows that for shell bodies with an R/t less than 100 the normal axisymmetric ring buckling will develop into nonsymmetric patterns. We demonstrate that there exist also a class of shells within this thickness-radius range for which nonsymmetric plastic buckling always occurs without the prior formation of a ring. It appears from the limited number of tests made that for a particular R, R/t, material and rate of loading there is a critical value of L, above which there is a high probability of the buckle pattern developing in a nonsymmetric fashion. It seems probable, too, that there are bands of R/t for a particular L/R, R, material and rate of loading for which the buckle number will be constant. The experiments tend to indicate that the postbuckling efficiency of the shell decreases with increasing buckle number. The nonsymmetric patterns demonstrated appear to be inextensional deformations. They are very similar in character to the Yoshimura pattern which occurs as the limiting case for thin shells in axial compression and, under impact loading. Load displacement histories are presented for some of the various modes of failure demonstrated.

AD-632 923 **Field 20K, 1B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
COMBINED INFLUENCE OF HIGHER-ORDER LINEAR EFFECTS AND NONLINEAR EFFECTS ON THE LATERAL VIBRATION BEHAVIOR OF SOLID AND SANDWICH BEAMS,
by J. Mayers and B. G. Wrenn. Sep 64, 48p
SUDAER-208
Contract DA-44-177-AMC-115 (T)

Descriptors: (*Vibration, *Beams (Structural)), Sandwich construction, Aerospace craft, Mathematical analysis.

This report presents the results of a study of the combined influence of higher order linear effects and nonlinear effects on the lateral vibration behavior of solid and sandwich beams in the presence of axial load. The higher order linear effects considered are transverse shear and rotatory inertia. The nonlinear effects considered are those which arise due to stretching of the longitudinal fibers of the beam during vibration. This stretching results from the consideration of variable axial boundary restraint. The predicted vibration behavior provides new design information for solid and sandwich beams of either metal or plastic construction, and correlates excellently in various limiting cases with the theoretical and experimental results obtained by previous investigators. (Author)

AD-632 932 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
FREE VIBRATIONS OF A SLENDER BAR WITH NON-UNIFORM CHARACTERISTICS,
by Chi-Hung Mok and E. A. Murray, Jr. Dec 65, 17p BRL-1305
Proj. RDT/E-1P222901A201

Descriptors: (*Vibration, *Rods), Slender bodies, Mathematical analysis, Experimental data, Torsion, Flexural strength.

The free vibrations of a slender bar with characteristics slightly different from those of a uniform one is discussed. A simple approximate solution to this problem is presented. Results from experiments conducted with a bar of variable cross-section in free-free flexural vibrations indicate that the theory adequately predicts resonant frequencies and nodal locations. (Author)

AD-633 076 **Field 20K, 22B, 14B**
CFSTI Prices: HC$7.00 MF$1.75
Naval Research Lab., Washington, D. C. Shock and Vibration Information Center.
THE SHOCK AND VIBRATION BULLETIN.
Apr 66, 373p Bull-35-Pt-6
Symposium on Shock, Vibration and Associated Environments (35th) was held in New Orleans, Louisiana on 25-28 October 1965. See also AD-631 234.

Descriptors: (*Shock (Mechanics), Symposia), (*Vibration, Symposia), Periodicals, Simulation, Drop testing, Impact tests, Impact shock, Test equipment, Spacecraft, Space environmental conditions, Environmental tests, Test facilities, Spacecraft docking, Acceleration, Structures, Loading (Mechanics), Jets, Catapults, Pneumatic devices.

Contents: shock testing to simulate random vibration peaks, 10,000 G slingshot shock tests on a modified sand-drop machine, shock springs and pulse shaping on impact shock machines, shock testing a spacecraft to shock response spectrum by means of an electrodynamic exciter, design and performance characteristics of a water jet actuator, reentry overpressure shock simulation test, shock testing with high explosive initiated gas detonations, a method of producing long-duration air-induced ground shock using high explosives, structural and functional tests of a full-scale gemini rendezvous and recovery section and an agena target docking adapter as subjected to an orbital mooring shock environment, extension of shaker shock capabilities, a new air gun for shock testing, investigation of parameters affecting dynamic pressures in super pressure generator used for cannon breech fatigue studies, the double force programmer shock testing method - a new technique for controlling shock pulse waveforms, aerospace shock test specified and monitored by the response spectrum, specification of acceleration pulses for shock tests, shock testing to shock spectra specifications, analog method for study of shock spectra in nonlinear systems, a mechanical shock pulse survey, proximity spectrum - a new means of evaluating shock motions, definition of shock design and test criteria using shock and fourier spectra of transit environments, structural response to impulsive loading (pyrotechnic devices).

AD-633 096 **Field 20K, 22B**
CFSTI Prices: HC$6.00 MF$1.50
Naval Research Lab., Washington, D. C. Shock and Vibration Information Center.
THE SHOCK AND VIBRATION BULLETIN.
Apr 66, 271p Bull-35-Pt-7
Symposium on Shock, Vibration and Associated Environments (35th) was held in New Orleans, La., 25-28 Oct 65. See also AD-631 234.

Descriptors: (*Shock (Mechanics), Symposia), (*Vibration, Symposia), Mathematical prediction, Damping, Spacecraft, Structures.

The papers presented concern (1) prediction of vibration environment and (2) damping and nonlinear analysis.

AD-633 138 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
FURTHER STUDY ON THE DYNAMIC STABILITY OF SHELLS,
by T. C. Fan. May 66, 9p P-3352

Descriptors: (*Structural shells, Stability), Equations, Dynamics, Loading (Mechanics).

AD-633 285 **Field 20K**
CFSTI Price: MF$0.50
Army Engineer Waterways Experiment Station, Vicksbury, Miss.
THE ELASTIC RESPONSE OF BURIED CYLINDERS IN SAND.
Miscellaneous paper, (Final rept.),
by R. E. Walker, G. E. Albritton, and T. E. Kennedy. Apr 66, 22p MP 1-810

Descriptors: (*Cylindrical bodies, Elasticity), (*Underground structures, Elasticity), Sand, Strain (Mechanics), Steel, Loading (Mechanics), Soil mechanics.

The objectives of the study were to investigate the elastic response of a relatively stiff steel cylinder buried in a dense, dry sand and to compare this response with that predicted by elastic theory. Three series of tests were conducted on a steel cylinder under both static and dynamic loading conditions. The cylinder had a test section length of 12 in. and a diameter of 6 in. The surface overpressures ranged from 0 to 350 psi, static, and from 100 to 250 psi, dynamic. The depth of cover over the crown ranged from 0 to 12 in. The results show that the dynamic strains are 0 to 40 percent higher than the strains at an equivalent static load, contradictory to elastic predictions of 10 to 20 percent. The maximum experimental hoop strains were measured on the outside at 180 deg; however, the elastic theory predicted the maximum strain to occur on the inside at 90 deg. Additionally, it was evident that strains (or response) are not a linear function of overpressure. Both the static and dynamic elastic theories compared in the study appear to be inadequate to predict the cylinder response for all overpressure levels. (Author)

AD-633 343 **Field 20K**
CFSTI Prices: HC$1.00. MF$0.50
Army Materials Research Agency, Watertown, Mæs. Materials Engineering Div.
FREQUENCIES AND MODE SHAPES FOR AXISYMMETRIC VIBRATION OF SHELLS.
Technical rept.,
by Edward W. Ross Jr., and William T. Mathews. Feb 66, 25p
Proj. DA-1P014501B33A,
Task 35791
AMRA TR-66-04

Descriptors: (*Elastic shells, *Vibration), Acoustics, Structural shells, Mechanical properties, Mathematical analysis.

This report treats the axisymmetric vibration of thin elastic shells. Estimates of natural frequencies and mode shapes are obtained for a general class of thin shells by applying the approximations ob-

tained in a previous paper by one of the authors. Numerical results are obtained for ellipsoidal shells, and one new theoretical result is found. (Author)

ANL-7097 **Field 20K**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
THREE-DIMENSIONAL STRESS CONCENTRATION AROUND A CYLINDRICAL HOLE IN A SEMI-INFINITE ELASTIC BODY,
by Carl K. Youngdahl and Eli Sternberg. Sep 65, 159p
Contract W-31-109-eng-38

Descriptors: (*Elasticity, Cylindrical bodies), (*Cylindrical bodies, Stresses).

N66-10418 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN EVALUATION OF THE EFFECT OF FINITE SHEAR STRAIN IN A SHALLOW, SPHERICAL SHELL,
by H. E. Williams. 1 Oct 65, 27p JPL-TR-32-780
Contract NAS7-100
NASA CR-67741

Descriptors: *Shear strain, *Thin walled shell, *Spherical shell.

N66-15639 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass.
DYNAMIC BUCKLING ESTIMATES,
by B. Budiansky and J. W. Hutchinson. 1964, 22p
Grant NsG-559
NASA CR-66030

Descriptors: *Dynamic response, *Loading rate, *Structural fatigue, *Compression buckling.

N66-15826 **Field 20K**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SATURN S-I-10 STATIC TEST VIBRATION AND ACOUSTIC DATA,
11 Jan 66, 112p NASA-TM-X-53377

Descriptors: *Saturn I launch vehicle, *Sound intensity, *Static testing, *Vibration measurement.

N66-15829 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
ELASTIC STABILITY OF A SLENDER BAR WITH FREE-FREE ENDS UNDER DYNAMIC LOADS,
by F. C. Liu. 10 Dec 65, 32p NASA-TM-X-53367

Descriptors: *Dynamic load, *Slender body, *Elastic stability, *Spacecraft stability.

N66-15847 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SOME RESEARCH RELATED TO THE STRUCTURAL DYNAMICS OF LAUNCH VEHICLES,
by H. L. Runyan. 1965, 30p NASA-TM-X-57131
Presented at the Intern. Symp. on Space Technol. and Sci., (6th) Tokyo, 29 Nov-4 Dec 65.

Descriptors: *Dynamic model, Saturn V launch vehicle, *Structural dynamics, *Wind effect, *Saturn I (SA-1) launch vehicle.

N66-16721 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
JUNCTURE STRESS FIELDS IN MULTICELLULAR SHELL STRUCTURES. VOLUME V. INFLUENCE COEFFICIENTS OF SEGMENTAL SHELLS,
by C. T. Chen, and P. Stern. Aug 65, 51p M-77-65-6
Contract NAS8-11480
NASA CR-70016

Descriptors: *Finite difference method, *Conical shell, *Stress computer program, *Cylindrical shell, *Spherical shell.

N66-17282 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.50
McDonnell Aircraft Corp., St. Louis, Mo.
COLLATION OF FLUCTUATING BUFFET PRESSURES FOR THE MERCURY (ATLAS AND APOLLO) SATURN CONFIGURATIONS,
by J. D. Shelton. 1966, 55p
Contract NAS1-3179
NASA CR-66059

Descriptors: *Angle of attack, *Atlas launch vehicle, *Mach number, *Buffeting, *Saturn launch vehicle.

N66-17568 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FILAMENT-OVERWRAPPED METALLIC CYLINDRICAL PRESSURE VESSELS,
by R. H. Johns and A. Kaufman. 1966, 26p
NASA-TM-X-52171
To be presented at Struct. and Mater. Conf. (7th), Cocoa Beach, Fla., Apr 18-20 1966, sponsored by AIAA and ASME.

Descriptors: *Cylinder, *Filament winding, *Metal shell, *Pressure vessel.

N66-18182 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
EXPERIMENTAL INVESTIGATIONS OF SIMULATED METEOROID DAMAGE TO VARIOUS SPACECRAFT STRUCTURES.
Summary rept.,
by J. W. Gehring, C. J. Maiden, A. R. McMillan, andR. E. Sennett. Jul 65, 72p TR-65-48
Contract NAS9-3081
NASA CR-65222

Descriptors: *Apollo project, *Mars probe, *Meteoroid protection, *Spacecraft shielding.

N66-18185 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
IMPACT OF ROD PROJECTILES AGAINST MULTIPLE-SHEET TARGETS,
by D. R. Christman and A. R. McMillan. Jul 65, 26p TR65-51
Contract NAS9-3081
NASA CR-65223

Descriptors: *Hypervelocity projectile, *Blunt body, *Impact damage, *Lift-drag ratio, *Projectile penetration, *Target penetration.

N66-18344 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A METHOD FOR ESTIMATING ACCELERATIONS OF SHIPPING CONTAINERS MOUNTED ON AN IMPACTING RAILROAD CAR,
by J. J. Scialdone. 1965, 22p NASA-TM-X-56537
Presented at the Shock and Vibration Symp. (35th), New Orleans, Oct 26-28 1965.

Descriptors: *Impact acceleration, *Container, *Railroad humping test.

N66-18427 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INTERFACES BETWEEN FATIGUE, CREEP, AND FRACTURE,
by S. S. Manson. 1966, 84p NASA-TM-X-52189

Descriptors: *Crack propagation, *Fatigue, *Creep, *Fracture.

TID-20697 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
ACF Industries, Inc., Albuquerque, N. Mex.
SECOND-ORDER THERMAL STRESS IN A THIN ELASTIC CYLINDER,
by J. E. Thompson. 28 May 64, 18p
Contract AT (29-1)-1352

Descriptors: (*Cylindrical bodies, Elasticity), (*Thermal stresses, Cylindrical bodies).

AD-632 707 **See Field 12A**

AD-632 715 **See Field 1C**

AD-632 898 **See Field 12A**

AD-632 929 **See Field 1B**

AD-632 930 **See Field 1B**

AD-632 968 **See Field 20J**

AD-633 161 **See Field 20D**

AD-633 274 **See Field 13J**

COO-578-P27-4 **See Field 11F**

20L. SOLID STATE PHYSICS

AD-289 290 **Field 20L**
CFSTI Price: HC$28.90
South Dakota School of Mines and Technology, Rapid City.
PROCEEDINGS OF THE BLACK HILLS SUMMER CONFERENCE ON TRANSPORT PHENOMENA 21-23 AUGUST 1962. Mainly Heat Flow and Charge Flow in Semiconductors at Elevated Temperatures.
Final rept.
15 Oct 62, 293p
Grant Nonr (G)-00064-62,
Proj. NR-017-459

Descriptors: (*Semiconductors, Transport properties), (*Transport properties, Symposia), (*Thermal conductivity, Semiconductors), High-temperature research, Silicon, Thermal diffusion, Zirconium, Specific heat, Barium compounds, Titanates, Thermistors, Hall effect, Micro wave frequency, Rare earth elements, Resistance (Electrical), Carriers (Semiconductors), Mercury alloys, Cadmium alloys, Tellurium alloys, Photoconductivity, Zinc compounds, Oxides, Field emission, Germanium.

Contents: Measurement of Thermal Conductivity at High Temperatures; Thermal Conductivity Measurements on Silicon to 1000 K; Thermal Diffusivity Measurements on a Finite Disk; Specific Heat of Zirconium by a Pulse Heating Method; Absolute Measurement of Thermal Conductivity; Thermal Measurements on Ferroelectric Barium Titanate Ceramics; Series Comparative Measurements of Thermal Conductivity with Thermistors; The Use of Thermal Comparator Methods for the

Measurement of Thermal Conductivity; Microwave Hall Mobility in Germanium; Lowtemperature Electrical Resistivity of Rare Earth Metals; The Theory of Electrical and Thermal Conductivity of Solids; Mixed Conduction in Semiconductors; Semiconducting Properties of Hg (1-x)Cd (x)Te; Dye-sensitized Photoconductivity of Zinc-oxide Films; Field Electron Emission from Semiconductors; Properties of Non-Stoichiometric Compound Semiconductors. (Author)

AD-632 779 **Field 20L, 20F, 9A**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Schenectady, N. Y. Research and Development Center.
NEW SOLID-STATE DEVICE CONCEPTS,
by M. Aven, R. N. Hall, and J. R. Richardson. Mar 66, 46p Rept. no. 66-GC-0324, Scientific-4
Contract AF 19 (628)-4976,
Proj. AF-4608,
Task 460805
AFCRL 66-225

Descriptors: (*Semiconductor devices, *Luminescence), Diodes (Semiconductor), Electroluminescence, Photochemistry, Photoconductivity, Zinc alloys, Selenium alloys, Tellurium alloys, Gallium alloys, Arsenic alloys, Silicon, Oxidation, Films, Solid state physics.

The electrical behavior of ZnSe sub x Te sub 1-x light-emitting diodes is analyzed in terms of the bulk electrical properties of the n- and p-type junction components. It is proposed that the mechanism of charge transport in the diodes involves photo-excitation with subsequent minority carrier trapping, which leaves the majority carriers free to carry current. A number of device applications based on the photoexcitation and quenching phenomena observed are discussed. A study of the mechanism of oxidation of silicon shows that there are serious difficulties with the simple models that are offered to explain the observed oxidation rates and electrochemical phenomena. The energy levels and diffusion characteristics of the various defects that might be active during oxidation are discussed, and a new model for silicon oxidation is outlined. The electrical properties of diodes made from thin films of high-resistivity GaAs show both a negative resistance and an interesting storage effect. A theory based on injected avalanche is proposed to explain the negative resistance. (Author)

AD-632 808 **Field 20L, 9B, 9A, 20C**
CFSTI Prices: HC$3.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
THE EXPERIMENTAL PRODUCTION OF THIN FERRITE FILMS AND A SURVEY OF THE MAGNETIC PROPERTIES OF THIN FILMS,
by R. J. Miller. 1 Mar 55, 55p NAVORD-3962
Previously announced as PB-121 177 dated 9 Oct 56 LC mi $3.30 ph $7.80.

Descriptors: (*Thin film storage devices, Ferrites), (*Ferrites, *Films), (*Magnetism, Films), Experimental data, Manufacturing methods, Sputtering, Ferromagnetic materials, Magnetic properties, Computer storage devices, Magnetic tapes.

This paper describes experiments which resulted in the production of thin ferrimagnetic films. The theories pertaining to the properties of thin ferromagnetic films and existing experimental data concerning the deviation of magnetization and other parameters of thin films from that of the bulk material will be reviewed. In conclusion suggestions for future study of the magnetic properties of thin films, in particular films of ferrimagnetic materials, are outlined. (Author)

AD-632 826 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.75
Delaware Univ., Newark. Dept. of Physics.
ELECTRICAL CONTACTS TO CADMIUM SULFIDE SINGLE CRYSTALS.
Master's thesis,
by Robert Burton Hall. Jun 66, 71p
Contract Nonr-4336 (00)

Descriptors: (*Cadmium compounds, Sulfides), (*Single crystals, Cadmium compounds), Indium, Titanium, Aluminum, Electrical properties, Evaporation, Semiconductors, Vapor plating, Vacuum apparatus, Impurities.

It is well known that at room temperature ohmic-behaving electrical contacts to CdS single crystals can easily be attained. However, at temperatures greater than 100C such contacts exhibit instability (e.g., diffusion of indium into the bulk of the crystal above 100C where, acting as a donor, it may dominate crystal behavior). A multilayer technique has been developed which permits evaporated electrodes to perform ohmically up to 300C. This technique is characterized by the usage of a preparative metal to 'clean' the surface of the crystal to be electroded, an active metal to serve as the ohmic-behaving electrical contact, and a covering metal to carry current and act as a diffusion sink. Although in half the cases a heat treatment of the multilayer-crystal system is necessary to create an ohmic-behaving contact, the results using titanium as the preparative metal and aluminum as the active metal have been completely successful. (Author)

AD-632 895 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Brown Engineering Co., Huntsville, Ala. Research Labs.
EXPERIMENTAL STUDY OF TEMPERATURE DEPENDENCE ON THE CHARACTERISTIC ELECTRON ENERGY LOSSES IN ALUMINUM, TIN, MAGNESIUM AND LEAD.
Summary technical progress rept.,
by Harry J. Watson, and Robert R. Mitchell. Apr 66, 40p Technical note TN-R-196
Contract Nonr-4549 (00),
Proj. NR-017-460

Descriptors: (*Foils, *Electron bombardment), (*Aluminum, Electron bombardment), (*Tin, Electron bombardment), (*Magnesium, Electron bombardment), (*Lead, Electron bombardment), Films, Electrons, Energy, Quantum mechanics, Cryogenics, Superconductivity.

Identifiers: Plasmons.

The characteristic energy losses which are observed when a thin film of metal is bombarded by an energetic beam of electrons were investigated as a function of temperature from 300K to 4.2K. The metals examined are tin, aluminum, magnesium and lead. The change in plasmon energy for magnesium and tin is almost linear, but the aluminum values increase rapidly below 77K while the values for lead decrease below 77K. The observed values are compared to those that would be expected due to a change in the free electron density caused by a thermal expansion or contraction of the sample. Values of the mean free path for plasmon production in aluminum are also presented as a function of temperature. (Author)

AD-632 935 **Field 20L, 20J**
CFSTI Prices: HC$5.00 MF$1.00
Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physica.
QUANTUM THEORY OF MOBILITY IN DOPED SEMICONDUCTORS.
Technical rept.,
by Elvin James Moore. Mar 66, 192p
Contract SD-88
ARPA 24

Descriptors: (*Semiconductors, *Quantum mechanics), (*Carriers semiconductors, Quantum mechanics), Transport properties, Electrons, Impurities, Ions, Scattering, Electrical conductance, Green's function, Gallium alloys, Arsenic alloys.

Identifiers: Gallium arsenide.

Existing quantum transport theories relevant to the problem of electron mobility in semiconductors due to ionized impurity scattering problem are extended and simplified to obtain a mobility formula, valid for weak impurity potentials, which includes corrections due to coherent scattering from groups of impurities.

AD-632 998 **Field 20L, 20E, 9A, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOLID STATE RESEARCH 1966-1.
Quarterly technical summary rept. 1 Nov 65-31 Jan 66,
by Alan L. McWhorter. 31 Jan 66, 76p
Contract AF 19 (628)-5167,
Proj. AF-649L
ESD TR-66-42
See also AD-629 048.

Descriptors: (*Solid state physics, Scientific research), (*Semiconductor devices, Scientific research), (*Lasers, Scientific research), (*Intermetallic compounds, Scientific research), Pumping (Electronics), Electron beams, Selenides, Sulfides, Cadmium compounds, Gallium alloys, Arsenic alloys, Phosphorescent materials, Zinc compounds, Titanium compounds, Oxides, Iron, Cyclotron resonance phenomena, Magnetism, Spinels, Magnetic resonance, Thulium, Electrical properties, Mercury compounds, Tellurides, Lead compounds, Rhenium compounds.

Identifiers: Cadmium selenide, Cadmium sulfide, Cadmium telluride, Gallium arsenide, Lead selenide, Mercuric telluride, Titanium oxides, Rhenium oxides.

Contents: Solid state device research; optical techniques and devices; materials research; physics of solids.

AD-633 098 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Dept. of Physics.
INVESTIGATION OF ISOBARIC ANALOGUE STATES BY (p,n) REACTIONS FOLLOWED BY PROTON EMISSION,
by A. I. Yavin, R. A. Hoffswell, L. H. Jones, andT. M. Noweir. 1966, 7p

Descriptors: (*Proton reactions, *Nuclear energy levels), (*Neutron reactions, Nuclear energy levels), Antiparticles, Zirconium, Radioactive decay, Niobium.

A new method is presented for the investigation of proton unstable isobaric analogue states.

AD-633 102 **Field 20L**
CFSTI Prices: HC$5.00 MF$1.00
California Univ., Los Angeles. Dept. of Physics.
ULTRASONIC ATTENUATION IN SODIUM AT LOW TEMPERATURES.
Technical rept.,
by Richard Stern. Aug 64, 133p TR-24
Contract N6onr-233 (48),
Proj. NR-014-302

Descriptors: (*Sodium, *Ultrasonic properties), (*Low temperature research, Sodium), Attenuation, Phase studies.

AD-633 148 **Field 20L, 7B, 20B, 8G**
CFSTI Prices: HC$3.00 MF$0.75
Harvard Coll., Cambridge, Mass. President and Fellows.
RESEARCH ON CHEMISTRY AND PHYSICS OF INORGANIC SYSTEMS UNDER EXTREME HIGH PRESSURE AND TEMPERATURE.

Final rept., 1 May 60-31 Oct 65,
by Peter M. Bell, William W. Atkinson Jr., Bobby G. Cahoon, and C. S. Hurlbut Jr. 1 Dec 65, 99p
Contract AF 19 (604)-7319,
Proj. AF-5621,
Task 562101
AFCRL 66-152

Descriptors: (*Minerals, Synthesis (Chemistry)), (*High-pressure research, Inorganic compounds), (*High-temperature research, Inorganic compounds), (*Inorganic compounds, Phase studies), Quartz, Calcite, Aragonite, Metamorphic rock, Pyrites, Aluminum compounds, Silicates, Crystal growth, Palladium, Arsenic compounds, Sulfides, Crystal structure.

Identifiers: Andalusite, Arsenic monosulfide, Coesite, Kyanite, Marcasite, Sillimanite.

Using the tetrahedral press and uniaxial press, experiments were carried out on SiO2, CaCO3, FeS2 and Al2SiO5. The quartz-coesite equilibrium was established at 350C and 23kb. Calcite and aragonite were synthesized from each other. The breakdown of marcasite to pyrite was determined as a function of pressure and temperature. The univariant point of the three polymorphs of Al2SiO5 was determined as 300C (plus or minus 50C) at 8kb (plus or minus 0.05kb). Experiments to synthesize highly pure quartz were carried out at first in alloy steel autoclaves and finally in palladium cans within the autoclaves. The purity of the quartz is dependent both on the purity of the container and of the starting materials. High purity quartz (impurities less than 10 ppm) was grown in a palladium can from high-purity crystallized high-purity silica glass. Single crystals of alpha-AsS were synthesized from natural realgar, beta-AsS. The synthesized crystals are shown to be triclinic. (Author)

AD-633 207 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Army Foreign Science and Technology Center, Washington, D. C.
EFFECT OF GAS SORPTION ON PHYSICAL PROPERTIES OF CdSe FILMS,
by J. Viscakas, and A. Medeisis. May 66, 16p
FSTC-HT-23-82-66
TT 66-61273
Trans. of Vilna Univ. Mokslo Darbai (Lithuanian SSR) v33 1960.

Descriptors: (*Semiconducting films, Sorption), (*Cadmium compounds, Selenides), Vapor plating, Oxygen, Hydrogen, Nitrogen, Air, Electrical conductance, Resistance (Electrical), Photosensitivity, Thickness, Heat of activation, USSR.

Identifiers: Cadmium selenide.

The films studied in the experiment were produced by vaporizing CdSe in vacuum on a glass base or on the bottom of a Diuar container with the help of electrodes. The study pertained to the effect of oxygen, hydrogen, nitrogen and air sorption on the electrical conductivity of CdSe layers. It was determined that oxygen has the greatest effect on changes in the electrical conductivity of CdSe layers. The specific resistance, changes in electrical conductivity, as well as changes in relative photo-sensitivity in the air depend on the thickness of the layer. Production conditions and the thickness of the film also determine the constant k. It was also shown that at low temperature, activating energy is lower in a vacuum than in oxygen, while pure nitrogen has no effect on it. (Author)

AD-633 276 **Field 20L, 7C**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
ORGANIC SEMICONDUCTORS: ANALYTICAL SURVEY.
Rept. no. 1 on ATD work assignment no. 79, task 28,
by Serge Markov. 1 Apr 66, 42p ATD-66-35
TT 66-61286
Based on Soviet open sources pub. 1960-65. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Semiconductors, Scientific research), (*Photoelectric materials, Scientific research), (*Organic materials, Semiconductors), USSR, Electrical properties, Magnetic properties, Acrylonitrile polymers, Polyethylene plastics, Polymers, Chlorine compounds, Polyvinyl alcohol, Bibliographies, Heat-resistant materials, Heat-resistant plastics, High-temperature research, Vinyl plastics.

The subject of this survey is basically Soviet research on the electrical properties of organic semiconductors and photoconductors. Material has also been included dealing with the preparation of such products, known or potential, and with their structure, morphology, and magnetic properties insofar as these are associated with electrical properties. The Introduction includes remarks about the importance attached to this research in the Soviet Union as well as a table listing the facilities associated with this research, involved scientists whose associations could be determined, and the appropriate references. The Analytical Section contains four parts: A. Heat-treated polyacrylonitrile, B. Irradiated and heat-treated polyethylene. C. Modified chlorine-containing polymers, and D. Modified poly (vinyl alcohol). In the Annotated Bibliography the 45 entries are grouped under the same four subject headings as listed above with the following distribution: A--19 entries, B--14 entries, C--10 entries, and D--2 entries. Within each subject area the entries are arranged chronologically in order of data of submittal to the editor to give some idea of the progress in time of the research. There are three lists appended to the report: 1. List of sources searched; 2. Author index; and 3. Association Index.

AD-633 388 **Field 20L, 11F, 5B**
CFSTI Prices: HC$6.00 MF$1.25
Martin Co., Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK.
Progress rept. no. 3,
by F. R. Schwartzberg, S. H. Osgood, R. D. Keys, andT. F. Kiefer. Mar 66, 232p
Contract AF 33 (657)-9161,
Proj. AF-7381,
Task 738106
ML TDR-64-280-Suppl.
Also announced as PB-171 809 (Revised), Suppl-3. See also AD-618 065.

Descriptors: (*Cryogenics, Materials), (*Handbooks, Cryogenics), (*Alloys, Cryogenics), Aluminum alloys, Stainless steel, Titanium alloys, Nickel alloys, Maraging steels, Chromium alloys, Cobalt alloys, Molybdenum alloys, Vanadium alloys, Titanium, Tin alloys, Copper, Mechanical properties, Welds, Thermal expansion, Test methods.

AD-633 412 **Field 20L, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
CONCERNING THE POSSIBILITY OF THERMAL SUPERCONDUCTIVITY IN SEMICONDUCTORS,
by A. N. Kozlov, and L. A. Maksimov. May 66, 9p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1C022001A012
TT 66-61377, AERDL T-1842-66
O Vosmozgnosti Sverchteploprovodnosti v Poluprovodnicach, trans. of Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki (USSR) v50 n1 p131-4 1966.

Descriptors: (*Semiconductors, Thermal conductivity), Band theory of solids, Superfluidity, Equations of motion, Thermodynamics.

The possibility of the existence of an undamped energy flux in a two-band system with pairing is demonstrated. The Landau criterion is proven for superfluidity in the case of crystal periodicity. The superfluid motion is stable with respect to transfer process and scattering on impurities.

AD-633 423 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
ELECTRON SPIN RESONANCE OF THE ICl (-) Vk-CENTER.
Technical repts.,
by Marvin L. Meistrich, and Lawrence S. Goldberg. May 66, 13p TR-2, TR-7
Contracts Nonr-401 (54), Nonr-401 (47)

Descriptors: (*Iodine compounds, *Chlorides), (*Color centers, *Electron spin resonance), Potassium compounds, Iodine, Lead, Cryogenics, Crystal lattice defects, Polarization, Hamiltonian.

The electron spin resonance of the ICl (-)Vk-center was observed in KCl:IPb below 35K. BY reorienting the centers with polarized light, the ESR spectrum was greatly simplified. The parameters of the spin Hamiltonian were calculated and are consistent with the proposed model of Vk-centers. (Author)

N66-10448 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.75
Radio Corp. of America, Harrison, N. J. Electronic Components and Devices.
HIGH MAGNETIC FIELD SUPERCONDUCTING PROPERTIES OF NB3 SN FILMS.
Final rept,
by N. S. Freedman, F. R. Nyman, H. C. Schindler, andK. Strater. Aug 65, 72p
Contract NAS3-4113
NASA CR-54183

Descriptors: *Magnetic shielding, *Niobium stannide, *Superconductivity, *Magnetic field.

N66-17281 **Field 20L**
CFSTI Prices: HC$5.00 MF$1.00
Field Emission Corp., McMinnville, Oreg.
BEHAVIOR OF VARIOUS ADSORBATES ON METAL SUBSTRATES.
Final rept. 3 Jun 64-18 Dec 65,
by C. J. Bennette, E. C. Cooper, R. W. Strayer, andL. W. Swanson. 18 Feb 66, 187p
Contract NAS3-5902
NASA CR-54704

Descriptors: *Cesium ion, *Electron emission, *Ionic propulsion, *Voltage breakdown, *Refractory metal.

N66-17303 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
University of Southern Calif., Los Angeles. Dept. of Physics.
FAR ULTRAVIOLET RESPONSE OF SILICON P-N JUNCTION PHOTODIODES,
by W. F. Crevier, D. B. Medved, A. L. Morse, andG. L. Weissler. 15 Jun 65, 43p USC-VACUV-101
Grant NsG-178-61
NASA CR-69816

Descriptors: *P-N junction, *Silicon junction, *Photo diode, *Resistivity, *Vacuum ultraviolet.

N66-17470 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Inst. of Optics.
PROPERTIES OF MULTILAYER FILTERS.
Interin rept. 1 Mar-31 Aug 65,
by P. W. Baumeister. 1965, 24p
Grant NsG-308-63
NASA CR-70459

Descriptors: *Metal film, *Multilayer structure, *Band pass filter, *Dielectric material.

TID-20546 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Materials Research Lab.
THE MIGRATION OF INTERSTITIAL ATOMS IN GOLD. I. EXPERIMENTAL,
by J. A. Venables and R. W. Balluffi. 1963, 34p
Contract AT (11-1)-1198

Descriptors: (*Gold, Ion bombardment), (*Atomic energy levels, Gold).

TID-20565 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Materials Research Lab.
THE MIGRATION ENERGY OF INTERSTITIAL ATOMS IN GOLD. II. ANALYSIS AND INTERPRETATION OF EXPERIMENTS,
by J. A. Venables, and R. W. Balluffi. 1964, 44p
Contract AT (11-1)-1198

Descriptors: (*Gold, Ion bombardment), (*Atomic energy levels, Diffusion).

AD-632 716 **See Field 9A**

AD-632 762 **See Field 5A**

AD-632 806 **See Field 9C**

AD-632 848 **See Field 9A**

AD-632 931 **See Field 9A**

AD-633 004 **See Field 20B**

AD-633 052 **See Field 11F**

AD-633 240 **See Field 20C**

AD-633 288 **See Field 9A**

TID-4005 (Pt. 1, 9th ed.) **See Field 11B**

20M. THERMODYNAMICS

AD-633 142 **Field 20M, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
CALCULATED THERMODYNAMIC PROPERTIES OF REAL HYDROGEN UP TO 30,000 ATMOSPHERES AND 3500K,
by D. N. Bixler, R. Piacesi, and A. E. Seigel. 1 Dec 65, 21p NOLTR-65-209, Ballistics Research-153
Proj. NOL-364

Descriptors: (*Hydrogen, Thermodynamics), Entropy, Thermal properties, Pressure, Gas ionization, Excitation, Dissociation, Molecular association, Equations of state, Light gas guns, Propellants.

Isentropic data for real hydrogen are calculated in a range of pressures up to 30,000 atmospheres and temperatures up to 3500K. The effects of ionization, excitation, and dissociation are considered negligible because of the relatively low temperatures and high densities involved. The effects of the intermolecular force are accounted for by fitting a virial coefficient equation to low temperature high density experimental data. These calculated data in turn are fitted to an empirical entropic equation of state. This particular equation of state is convenient for describing many thermodynamic processes. (Author)

AD-633 218 **Field 20M, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
APPARATUS FOR THERMAL ANALYSIS WITH PROGRAMMED SCHEDULE.
Technical translation,
by A. L. Khutsaidze. May 66, 11p
PA TT-13, TT 66-61279
Trans. of Akademiya Nauk Gruzinskoi SSR, Tiflis. Soobshchenie, v26 n6 p681-6 1961.

Descriptors: (*Differential thermal analysis, *Potentiometers), Automatic, Design, USSR.

A new variant of the EPP-09 electronic automatic recording potentiometer, designed for use in differential thermal analysis, is described in detail and discussed. Advantages of the new apparatus, which records its findings on tape, are listed. A number of typical thermograms made with the EPP-09 are given. (Author)

N66-10045 **Field 20M**
CFSTI Prices: HC$4.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
FLOW FIELD PREDICTION AND ANALYSIS. PROJECT FIRE,
by M. J. Brunner, C. V. Dohner, V. A. Langelo, andH. Rie. 29 May 64, 113p 64SD727
Contract NAS-1-3418
NASA CR-60451

Descriptors: *Flow field, *Fire project.

N66-10214 **Field 20M**
CFSTI Prices: HC$5.00 MF$1.25
Emerson Electric of St. Louis, Mo. Electronics and Space Div.
PERFORMANCE EVALUATION OF THERMOLAG MATERIAL FOR ENTRY HEAT PROTECTION OF ADVANCED MANNED SPACECRAFT.
Quarterly progress rept, 1 Jan-1 Apr 63.
1963, 188p
Contract NAS-9-877
NASA CR-65167

Descriptors: *Mechanical property, *Thermal protection, *Manned spacecraft, *Solid state, *Thermal property.

N66-15350 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Manned Spacecraft Center, Houston, Tex.
ENTRY PERFORMANCE OF THE MERCURY SPACECRAFT HEAT SHIELD,
by R. B. Erb, and S. Jacobs. 1964, 82p NASA-TM-X-57097
Presented at the AIAA entry Tech. Conf., Heat Protection Session, Williamsburg, Hampton, Va., Oct 12-14 1964.

Descriptors: *Ablating material, *Heat shield, *Mercury capsule, *Performance characteristics, *Flight performance.

N66-15356 **Field 20M**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Huntsville, Ala.
SUMMARY OF BASE THERMAL ENVIRONMENT. MEASUREMENTS ON THE SATURN I BLOCK. I. FLIGHT VEHICLES,
by I. P. Jones Jr. 3 Sep 65, 158p NASA TM-X-53326

Descriptors: *Saturn I Launch vehicle, *Temperature measurement, *Thermal environment.

N66-15773 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
BUBBLE FORMATION AND GROWTH. STUDY OF THE BOUNDARY CONDITIONS AT A LIQUID-VAPOR- INTER- FACE THROUGH IRREVERSIBLE THERMODYNAMICS.
Quarterly progress rept. Jun-Aug 65,
by W. Bornhorst and A. Shavit. Sep 65, 21p
Contract NAS8-20013
NASA CR-69547

Descriptors: *Irreversible process, *Thermodynamics, *Fluid boundary, *Liquid-vapor interface.

N66-16747 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LAMINAR BOUNDARY-LAYER HEAT TRANSFER FROM A PARTIALLY-IONIZED MONATOMIC GAS BY THE SIMILARITY APPROACH,
by L. H. Back. 1 Feb 66, 31p JPL-TR-32-867
Contract NAS7-100
NASA CR-70035

Descriptors: *Heat transfer, *Ionized gas, *Monatomic gas, *Laminar boundary layer, *Wind tunnel wall.

N66-17570 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF DEVELOPING LAMINAR FLOW AND HEAT TRANSFER IN A TUBE FOR A GAS WITH VARIABLE PROPERTIES,
by R. G. Deissler, and A. F. Presler. 1966, 16p
NASA-TM-X-52174
To be presented at Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Helium, *Laminar flow, *Heat transfer, *Numerical analysis.

N66-17572 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN ANALYSIS OF THE TRANSIENT SOLIDIFICATION OF A FLOWING WARM LIQUID ON A CONVECTIVELY COOLED WALL,
by J. M. Savino, and R. Siegel. 1966, 20p NASA-TM-X-52176
To be presented at Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Freezing, *Liquid cooling, *Thermal convection.

N66-17573 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
A GENERALIZED CORRELATION OF VAPORIZATION TIMES OF DROPS IN FILM BOILING ON A FLAT PLATE,
by K. J. Baumeister, T. D. Hamill, and G. J. Schoessow. 1966, 17p NASA-TM-X-52177
To be presented at Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Film boiling, *Leidenfrost phenomenon, *Vaporization.

N66-17574 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
HEAT TRANSFER FOR LIQUID METAL FLOW IN RECTANGULAR CHANNELS WITH PRESCRIBED WALL HEAT FLUXES AND HEAT SOURCES IN THE FLUID STREAM,
by R. M. Inman. 1966, 40p NASA-TM-X-52178
To be presented at Fluid Mechs. and Heat Transfer Inst., Santa Clara, Calif., Jun 22-24, 1966.

Descriptors: *Channel flow, *Heat transfer, *Liquid metal, *Thermal convection.

N66-17575 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.

INCIPIENCE, GROWTH, AND DETACHMENT OF BOILING BUBBLES IN SATURATED WATER FROM ARTIFICIAL NUCLEATION SITES OF KNOWN GEOMETRY AND SIZE,
by J. R. Howell, and R. Siegel. 1966, 26p NASA-TM-X-52179
To be presented at Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Bubble, *Nucleate boiling, *Water.

N66-17576 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECTS OF CRYODEPOSITS ON SPACECRAFT THERMAL CONTROL SYSTEMS,
by D. G. McConnell. 1966, 11p NASA-TM-X-52181
Presented at Natl. Conf. on Space Maintenance and Extra Vehicular Activities, Orlando, Fla., Mar 1-3, 1966, sponsored by AF and Martin Co.

Descriptors: *Deposit, *Cryogenics, *Heat regulation, *Spacecraft design.

N66-17577 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
RAREFIED-GAS HEAT TRANSFER BETWEEN PARALLEL PLATES BY A MONTE CARLO METHOD,
by M. Perlmutter. 1966, 18p NASA-TM-X-52182
To be presented at the Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Gas flow, *Heat transfer, *Monte Carlo method, *Parallel plate, *Rarefied gas.

N66-17578 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FILM BOILING HEAT TRANSFER FROM A HORIZONTAL SURFACE AS AN OPTIMAL BOUNDARY VALUE PROCESS,
by K. J. Baumeister, and T. D. Hamill. 1966, 14p NASA-TM-X-52183
To be presented at the Intern. Heat Transfer Conf. (3rd), Chicago, Aug 8-12, 1966.

Descriptors: *Boundary value, *Film boiling, *Heat transfer.

N66-18162 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
Aerojet-General Corp., Covina, Calif. Aetron Div.
RECOMMENDED COOLDOWN PROCEDURES FOR E-ZONE CRYOGENIC PIPING SYSTEMS,
Dec 63, 21p
Contracts NAS8-4014, NAS8-4015
NASA CR-70517

Descriptors: *Pipeline, *Cooling system, *Cryogenic equipment, *Liquid gas.

N66-18342 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SHOCKED GAS TEMPERATURE MEASUREMENTS BY INFRARED MONOCHROMATIC RADIATION PYROMETRY,
by F. E. Belles, J. H. Hall, and M. R. Lauver. 1965, 30p NASA-TM-X-56330
Presented at the Shock Tube Symp., Silver Spring, Md., Apr 28-30, 1965.

Descriptors: *Infrared radiation, *Monochromatic radiation, *Carbon dioxide, *Radiation pyrometer.

N66-18345 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MEASUREMENT OF HEMISPHERICAL TOTAL EMITTANCE AND NORMAL SOLAR ABSORPTANCE OF SELECTED MATERIALS IN THE TEMPERATURE RANGE 280 DEG TO 600 DEG K,
by H. B. Curtis. 30 Mar 65, 21p NASA-TM-X-56273
Presented at the AIAA Ann. Meeting (1st), Jun 1964.

Descriptors: *Emission, *Material testing, *Thermal radiation, *Solar absorber.

N66-18368 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FILM BOILING HEAT TRANSFER TO WATER DROPS ON A FLAT PLATE,
by K. J. Baumeister, T. D. Hamill, G. J. Schoessow, and F. L. Schwartz. 1965, 24p NASA-TM-X-52103
Presented at the Natl. Heat Transfer Conf. (8th), Los Angeles, Aug 8-11 1965.

Descriptors: *Drop, *Evaporation rate, *Film boiling, *Flat plate, *Heat-transfer coefficient, *Water vapor.

N66-18390 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
LAMINAR SLIP FLOW IN A FLAT DUCT OR A ROUND TUBE WITH UNIFORM WALL HEAT TRANSFER,
by R. M. Inman. 22 Sep 64, 37p NASA-TM-X-56055

Descriptors: *Flat surface, *Heat transfer, *Laminar flow, *Circular tube.

AD-632 685 **See Field 7D**

AD-632 755 **See Field 7D**

AD-633 118 **See Field 20D**

AD-633 412 **See Field 20L**

20N. WAVE PROPAGATION

AD-632 664 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
TRANSIENT WAVE PROPAGATION IN AN INHOMOGENEOUS MEDIUM.
Scientific rept.,
by Michael A. Gray. 20 Jan 66, 55p Scientific-264
Contract AF 19 (628)-4014, Grant NSF-GP-5611,
Proj. AF-8605,
Task 860502
AFCRL 66-264

Descriptors: (*Electromagnetic waves, Propagation), (*Transients, *Wave transmission), Wave functions, Integral transforms, Bessel functions, Plasma medium, Oscillation.

Electromagnetic wave propagation in a medium with an exponentially increasing charge density is studied. Both transmitted and reflected fields are found in the case of plane, monochromatic waves. The use of the bilateral Laplace transform allows the transforms of the transmitted and reflected fields to be found in the case of a step-function excitation moving with velocity c sub o previous to entering the exponential medium. The reflected and transmitted fields are found explicitly when the Bessel functions obtained as solutions can be expanded asymptotically for small argument. (Author)

AD-632 783 **Field 20N, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Plasma Physics, Nagoy Univ. (Japan).
TRANSMISSION AND ABSORPTION OF ELECTROMAGNETIC WAVES IN A COLLISIONLESS PLASMA SLAB.
Research rept.,
by Ryo Sugihara. Feb 66, 30p IPPJ-46

Descriptors: (*Electromagnetic waves, Plasma medium), (*Plasma physics, Electromagnetic waves), (*Electromagnetism, Plasma medium), Wave transmission, Resonance absorption.

An investigation is made of the propagation of electromagnetic waves normal to a plasma slab having a density grandient. The plane of polarization of waves is perpendicular to an external magnetic field. At resonances, a WKB-type approximation does not represent waves and an appreciable absorption appears due to infinitesimal collisions: so called the resonance absorption. The transmission and absorption coefficients are obtained in the limit of no collisions when in the slab the cut off is adjacent to the resonance. (Author)

AD-632 794 **Field 20N, 20I, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Sylvania Electronic Systems, Waltham, Mass. Applied Research Lab.
EXPERIMENTAL STUDIES OF NONLINEAR PLASMA EFFECTS WITH SLOT ANTENNAS IN IONIZED HELIUM.
by M. H. Mentzoni, and J. Donohoe. 25 Mar 66, 50p S-5158-1, Scientific-1
Contract AF 19 (628)-5718,
Proj. AF-4642,
Task 464202
AFCRL 66-247

Descriptors: (*Slot antennas, Plasma sheath), (*Plasma physics, Slot antennas), Helium, Ionization, Radiofrequency, Electromagnetic pulses, Gas ionization, Antenna radiation patterns, Information theory.

Pulsed RF breakdown for a slot antenna was investigated. In particular, the formative time lag for breakdown, tau was measured as a function of gas pressure, power level, pulse repetition rate, pulse width, and imposed preionization level. Measurements revealed that breakdown initially occurs only after a large number of pulses according to an accumulative electron density buildup scheme which is statistical in nature. The relationship between tau and power and pressure was similar to what was measured in waveguides with the breakdown field strength nearly equal to the maximum field in the waveguide feeding the antenna. Tau increased markedly with the time between pulses, T, particularly at the lower pressures. After a few milliseconds tau increased linearly with T consistent with an exponential decay of the plasma sheath and diffusion being the only electron removal process during the formative time lag. Various imposed preionization levels were furnished by striking a pulsed DC discharge to the ground plane of the antenna and selecting various times, t, during the afterglow for the high power RF illumination. The density across the central portion of the DC discharge vessel N1 (o) was measured by microwave diagnostic techniques. Tau increased by decreasing N1 (o) and increasing t; the relationship between tau and t was found to be linear indicating an exponential decay of the local electron density the afterglow, which was in accordance with theoretical computations. As expected, tau did not depend on the high power RF pulse width. (Author)

AD-633 065 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.

THEORY AND EXPERIMENT FOR HIGHER MOMENTS OF FIELDS SCATTERED BY RANDOM DISTRIBUTIONS.
Technical memo.,
by T. H. Kays, and V. Twersky. 1 Nov 65, 86p
EDL-M809
Contract DA-28-043-AMC-00379 (E)

Descriptors: (*Microwaves, Scattering), (*Field theory, Microwaves), Theory, Experimental data.

AD-633 099 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.
FUNDAMENTAL SCATTERING PARAMETERS OBTAINED FROM LOW-N DATA.
Technical memo.,
by Sandra W. Hawley, Victor Twersky, and Thomas H. Kays. 1 Nov 65, 80p EDL-M808
Contract DA-28-043-AMC-00379 (E)

Descriptors: (*Millimeter waves, Scattering), Electromagnetic waves, Reflectors, Spheres, Styrene plastics, Expanded plastics, Probability, Distribution, Refractive index.

Scattering measurements on random distributions are often undertaken to obtain information on the properties of the component scatterers. One seeks to isolate the scattering amplitude (the angle dependent part of the usual far-field form) of a component scatterer, particularly its forward scattered value f=Ref+i Im f. Conventional techniques provide data on the average total intensity and on the coherent phase. Under the best of conditions, coherent intensity and phase data for sparse distributions of concentration rho enable one to determine rho Re f and rho Im f. To isolate f by intensity and phase measurements, one must therefore have some supplementary means of determining rho. Alternatively, other average scattering functions of the distribution can be sought which involve Re f, Im f, and rho differently. In particular, as shown previously, the magnitude of the covariance of the phase-quadrature components of the field depends essentially on rho absolute value of f squared. The theory for isolating f independently of rho is summarized, and several procedures are illustrated by millimeter wave data obtained for different random distributions of spheres. (Author)

AD-633 428 **Field 20N, 17B**
CFSTI Prices: HC$2.00 MF$0.50
Smyth Research Associates, San Diego, Calif.
TRANSEQUATORIAL 'F' LAYER STUDY.
Interim rept. for Dec 65-Feb 66,
by J. L. Heritage, and E. D. Bowen. Apr 66, 43p
SRA-503
Contract AF 30 (602)-3379,
Proj. AF-4505,
Task 450504
RADC TR-66-218

Descriptors: (*Radio transmission, *Ionospheric propagation), Low frequency, Radio waves, Propagation, Multipath transmission, Angle of arrival, Radio equipment, Ryukyu Islands, Australia, Pacific Ocean, Electromagnetic warfare.

Identifiers: F-region, Transequatorial radio propagation, Okinawa.

Three months' data have been collected in a study of transequatorial F-layer radio propagation in the Far East. Three 24-hour transmissions per week are made from Okinawa on frequencies from 34 to 90 MHz and received at Darwin, Australia and Lautoka, Fiji Islands. The Okinawa - Darwin path is 4,300 km long, symmetrically displaced about the magnetic equator; it lies in a magnetic meridian plane. The Okinawa - Fiji path is 7,300 km long and cuts across the magnetic equator at an angle of 36 degrees. The months of December 1965, and January and February 1966 were typical of the solstice period -- regular midday reception on both paths on 34 MHz but little activity on the higher frequencies. Occasional VHF openings occurred at Darwin but seldomly at Fiji. With the approach of the equinox, March provided a dramatic increase of VHF activity at Darwin with frequent nighttime transmission of frequencies up to 77 MHz. Fiji VHF reception has also become more active but on a reduced scale relative to Darwin -- only one case of 54 MHz reception to date. The CW recording is working well with reliable acquisition of signals every time an opening occurs. Fair success has been achieved with the special experiments aimed at propagation mode identification. Pulse resolution of multipaths and angle of arrival measurement are producing results but need further development. (Author)

N66-16979 **Field 20N**
CFSTI Prices: HC$4.00 MF$1.00
Illinois Univ., Urbana. Dept. of Electrical Engineering.
PROPAGATION OF EM WAVES IN LINEAR, PASSIVE, GENERALIZED MEDIA.
Scientific rept. no. 9,
by O. B. Kesler. Oct 65, 162p Rept. no. 65-9
Grant NsG-395
NASA CR-70212

Descriptors: *Electromagnetic field, *Wave propagation, *Theoretical physics.

N66-18165 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico Univ., Albuquerque. Bureau of Engineering Research.
INVESTIGATION OF RADAR ECHOES FROM THE MOON AND PLANETS, USING METHODS AND DATA FROM EARTH RADAR-RETURN STUDIES.
Semiannual status rept. 1 May-31 Oct 1965,
by J. A. Doran, A. Erteza and D. H. Lenhert. Dec 65, 13p EE-130
Grant NsG-129-61
NASA CR-70509

Descriptors: *Electromagnetic measurement, *Sphere, *Backscatter, *Radar reflector, *Surface property.

AD-632 665 **See Field 4A**

AD-632 915 **See Field 17I**

AD-633 036 **See Field 17I**

AD-633 237 **See Field 4A**

AD-633 272 **See Field 4A**

AD-633 351 **See Field 17I**

AD-633 417 **See Field 4A**

TID-21380 **See Field 17B**

21A. AIR-BREATHING ENGINES

AD-458 348 **See Field 21H**

21B. COMBUSTION AND IGNITION

AD-450 504 **Field 21B, 21I**
CFSTI Price: HC$1.60
Aerojet General Corp., Sacramento, Calif.
INVESTIGATIONS OF THE MECHANISMS OF DECOMPOSITION, COMBUSTION, AND DETONATION OF SOLIDS.
Quarterly technical operating rept. no. 19, 1 Jul-30 Sep 64,
by L. J. Rosen. Oct 64, 17p Rept. no. 0372-01-19Q
Contract AF 49 (638)-851, ARPA Order-24-60,
Projs. AF-4759, OSR-9750,
Task 37501
See also AD-454 417.

Descriptors: (*Flames, Chemical reactions), (*Solid rocket propellants, Combustion), Ammonia, Nitrogen compounds, Oxides, Jet flames, Combustion products, Reaction kinetics, Transport properties, Composite propellants, Decomposition, Detonation, Vapors.

Identifiers: Nitrogen oxides.

Apparent flame strength (AFS) measurements were made on the ammonia-nitric oxide and ammonia-nitrous oxide flame reactions in the opposed-jet reactor at pressures ranging from 100 to 745 torr. The pressure dependencies of the apparent flame strengths of these systems gave overall reaction orders of 1.56 and 2.0 for NH3-NO and NH3-N2O counterflow diffusion flames, respectively. The overall stoichiometry of the NH3-NO flame near extinguishment can be represented by the following equation: 1.5 NH3 + NO yields 1.25 N2 + 1.25 H2 + H2O. The volumetric reaction rate for this flame reaction was computed using Spalding's analysis of the opposed-jet flame. At 1 atmosphere, an apparent flame strength of 0.65 gm/sq cm-sec corresponded to a volumetric reaction rate of 2.93 gm/cu cm-sec release rate of 7,220 cal/cu cm-sec. (Author)

AD-632 730 **Field 21B, 21D, 11H**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Mines, Bruceton, Pa. Explosives Research Center.
IGNITION CHARACTERISTICS OF FUELS AND LUBRICANTS,
by Joseph M. Kuchta, Ralph J. Cato, George H. Martindill, and Whittner H. Gilbert. Mar 66, 83p
Proj. AF-3048,
Task 304801
AFAPL TR-66-21

Descriptors: (*Fuels, *Ignition), (*Airplane engine oils, Ignition), Alkanes, Jet engine fuels, Hydrocarbons, Flames, Reaction kinetics, Temperature, Flammability.

Identifiers: JP-6 fuels.

The combustibles included n-hexane, n-octane, n-decane, JP-6 jet fuel, aircraft engine oil MIL-L-7808, and other hydrocarbon materials. Expressions based on thermal ignition theory are given which correlate minimum autoignition and wire ignition temperatures of the combustible vapor-oxidant mixtures as a function of the heat source dimensions, oxygen concentration, ignition delay, and initial mixture temperature (in wire ignitions). The ignition temperatures increased consistently with decreasing heat source diameter or surface area. Hot gas ignition temperatures determined for the combustibles with various size jets of hot air also varied with heat source diameter; they tended to approximate the hot surface ignition temperatures when the size of the heat source and ignition criterion were the same. Jet temperatures required to produce hot flames and luminous or cool flame reactions were also compared. In oxidation rate studies at reduced pressures with JP-6 and n-octane vapor-oxygen-nitrogen mixtures, the critical pressures for cool flame reactions increased with decreasing vessel size, temperature, oxygen concentration, and fuel concentration. In flammability studies with hydrocarbon fuel vapor-air mixtures, the upper limits of flammability are shown to increase markedly with increasing temperature, particularly in the case of the high molecular weight paraffins which display a greater tendency to form cool flames. (Author)

AD-458 348 **See Field 21H**

AD-632 755 **See Field 7D**

AD-633 308 **See Field 21H**

21C. ELECTRIC PROPULSION

AD-632 824 **Field 21C**
CFSTI Prices: HC$1.00 MF$0.50
Charged Particle Research Lab., Univ. of Illinois, Urbana.
CHARGED COLLOIDAL SIZED PARTICLES FOR PROPULSION.
Final rept. Nov 63-Nov 65,
by C. D. Hendricks. Apr 66, 13p CPRL-3-66
Grant AF-AFOSR-107-64,
Proj. AF-9752,
Task 975201
AFOSR 66-0865

Descriptors: (*Charged particles, Colloids), (*Electric propulsion, Sprays), Capillary tubes, Electric currents, Thrust.

Identifiers: Colloid engines.

The report deals with parametric studies of the spraying of colloidal charged particles from a capillary. Both dc and ac sources were used. The main conclusion is that the thrust levels from colloidal systems are rising whereas the demands for thrust in many missions such as satellite attitude control, orbit maintenance, etc. are falling. The implication is that the colloid system shows more promise than it was originally believed to possess for use in such missions. (Author)

N66-16920 **Field 21C**
CFSTI Prices: HC$4.00 MF$1.00
Litton Industries, San Carlos, Calif. Electron Tube Div.
ANALYSIS OF ELECTRON-ION MIXING IN ION ENGINES.
Final rept. 30 Apr 64-30 Jun 65,
by D. F. Brauch and R. P. Wadhwa. 20 Jul 65, 150p
Contract NAS3-5757
NASA CR-54419

Descriptors: *Computer program, *Ion engine, *Electron-ion recombination.

N66-17571 **Field 21C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INVESTIGATION OF THE DISCHARGE AND EXHAUST BEAM OF A SMALL ARC PLASMA THRUSTOR,
by D. N. Bowditch. 1966, 28p NASA-TM-X-52175
Presented at Plasmadynamics Conf., Monterey, Calif., Mar 2-4, 1961, sponsored by AIAA.

Descriptors: *Ion engine, *Thrustor, *Plasma propulsion.

21D. FUELS

AD-633 413 **Field 21D**
CFSTI Prices: HC$1.00 MF$0.50
Institute of Modern Languages, Inc., Washington, D. C.
THAT THE FUEL BE PURE,
by V. N. Zrelov, and K. V. Rybakov. May 66, 7p
Contract DA-44-009-AMC-1563 (T),
Proj. DA-1M643324D-592
AERDL T-1843-66, TT 61378
Trans. of Vestnik Protivovosdushnoi Oborony (USSR) n1 p83-4 1966.

Descriptors: (*Aviation fuels, Purification), USSR.

AD-632 730 **See Field 21B**

PB-170 058 **See Field 5C**

PB-170 061 **See Field 5C**

PB-170 066 **See Field 5C**

PB-170 090 **See Field 5C**

PB-170 165 **See Field 5C**

21E. JET AND GAS TURBINE ENGINES

AD-632 675 **See Field 10A**

21F. NUCLEAR PROPULSION

AD-632 868 **See Field 18E**

21H. ROCKET MOTORS AND ENGINES

AD-458 348 **Field 21H, 1A, 21B, 21A**
CFSTI Prices: HC$5.60
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
MIXING AND BURNING OF BOUNDED COAXIAL STREAMS.
Technical rept.,
by C. E. Peters, T. Peters, and R. B. Billings. Mar 65, 54p AEDC-TR-65-4
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tenn.

Descriptors: (*Rocket motors, Exhaust gases), (*Exhaust gases, Jet Mixing flow), (*Jet mixing flow), (*Jet mixing flow, Exhaust gases), (*Combustion, Exhaust gases), Air-breathing engines (Unconventional), Rocket motor nozzles, Oxygen, Hydrogen, Ducts, Performance (Engineering), Chemical reactions, Theory, Thrust augmentor nozzles, Nozzle gas flow, Air, Injection.

Identifiers: Air-augmented rocket motors.

An experimental and theoretical investigation of bounded turbulent mixing with chemical reactions is described. Configurations which are applicable to the air-augmented rocket are considered. Experimental results are presented for a mixing apparatus in which a fuel-rich O2-H2 rocket stream was mixed with a secondary air stream inside a conical duct. An integral mixing theory is described, in which conservation equations are satisfied across the duct. The inviscid portions of the duct flow are considered one-dimensional, and the mixing zone profiles are assumed to exhibit shape similarity. The theory is extended to include the downstream regime where the mixing region extends across the entire duct. Correlations of the theory with incompressible and reactive compressible mixing experiments indicate that the theory provides a satisfactory overall representation of the bounded mixing process. (Author)

AD-632 862 **Field 21H, 1C**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
LIQUID FUEL ROCKET ENGINES FOR AIRCRAFT,
by Paul Douessin. 1966, 8p Translation-970
TT 66-61261
Les Propulseurs Fusees a Liquides pour Avions, trans. of Forces Aeriennes Francaises, n193 p883-96 1963.

Descriptors: (*Aircraft engines, *Rocket motors (Liquid propellant)), Design, USSR, France.

AD-633 308 **Field 21H, 21I, 21B**
CFSTI Prices: HC$3.00 MF$0.75
Jet Propulsion Center, Purdue Univ., Lafayette, Ind.
SMALL-AMPLITUDE COMBUSTION PRESSURE OSCILLATIONS IN THE GAS ROCKET.
Technical memo.,
by P. J. Goede. Jun 66, 74p TM-66-4, JPC-420
Grants AF-AFOSR-753-65, AF-AFOSR-753-66

Descriptors: (*Rocket motors, Combustion), (*Combustion, Oscillation), Pressure, Gases, Reation kinetics, Perturbation theory, Propagation, Flames, Nozzles, Stability.

The problem of small-amplitude, high-frequency, longitudinal combustion pressure oscillations in a rocket motor burning premixed gaseous propellants is the object of study of the analysis. Combustion zone chemical kinetics is found to be the driving mechanism of the phenomenon. A linearized, small-perturbation analysis is used to investigate the propagation of non-isentropic waves through the non-adiabatic flame zone. Effects of steady state chamber operating parameters on the amplification of oscillations are then presented with comparison to experimental trends. For example, in the equivalence ratio - chamber length stability plot a certain degree of correlation is noted. (Author)

N66-16746 **Field 21H**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SOME DESIGN CONSIDERATIONS, LARGE EXPULSION BLADDERS FOR NITROGEN TETROXIDE AND HYDRAZINE,
by A. J. Bauman. 15 Jan 66, 38p JPL-TR-32-862
Contract NAS7-100
NASA CR-70034

Descriptors: *Fuel tank, *Liquid propellant, *Bladder, *Permeability, *Propulsion system.

N66-18158 **Field 21H**
CFSTI Prices: HC$3.00 MF$0.75
Marquardt Corp., Van Nuys, Calif.
HYDROGEN RELIQUEFIERS FOR LUNAR STORAGE SYSTEMS,
by A. Malek, R. McGlone, and T. A. Sedgwick. 12 Mar 64, 98p Rept. no. 6033
Contract NAS8-5298
NASA CR-70531

Descriptors: *Liquid hydrogen, *Lunar flight, *Propellant storage.

N66-18159 **Field 21H**
CFSTI Prices: HC$4.00 MF$0.75
Thiokol Chemical Corp., Denville, N. J. Reaction Motors Div.
GAS MIXTURES FOR DYNAMIC SIMULATION OF ROCKET EXHAUST JETS.
Final progress rept. 12 Apr-11 Nov 65,
by W. R. Marsh. 23 Nov 65, 117p RMD-5804-F
Contract NAS8-20057
NASA CR-70510

Descriptors: *Exhaust jet, *Flight simulation, *Gas mixture, *Rocket exhaust.

AD-633 299 **See Field 11B**

21I. ROCKET PROPELLANTS

N66-16155 **Field 21I**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
EFFECTS OF VARIOUS ADDITIVES ON PHYSICAL PROPERTIES AND PERFORMANCE OF MONOMETHYLHYDRAZINE,
by H. Perkins. 3 Nov 65, 18p NASA-TM-X-53356

Descriptors: *Water, *Methyl hydrazine, *Nitrogen compound, *Physical property.

AD-450 504 **See Field 21B**

AD-633 308 **See Field 21H**

22A. ASTRONAUTICS

N65-28248 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
AN ITERATIVE GUIDANCE SCHEME AND ITS APPLICATION TO LUNAR LANDING,
by Helmut J. Horn, Daniel T. Martin, and Doris C.Chandler. Jul 65, 30p NASA-TN-D-2869

Descriptors: (*Soft landings, Moon), (*Guidance, Soft landings).

N66-10342 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A PHOTOMETRIC METHOD FOR DERIVING LUNAR TOPOGRAPHIC INFORMATION,
by T. Rindfleisch. 15 Sep 65, 20p JPL-TR-32-786
Contract NAS7-100
NASA CR-67718

Descriptors: *Photometry, *Coordinate system, *Lunar topography.

N66-10426 **Field 22A**
CFSTI Prices: HC$7.00 MF$2.00
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
RESEARCH AND ADVANCED DEVELOPMENT. VOLUME I. SUPPORTING RESEARCH AND TECHNOLOGY FOR THE OFFICE OF SPACE SCIENCES AND APPLICATIONS, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
Semiannual review, 1 Jan - 30 Jun 1965.
15 Aug 65, 409p JPL-TM-33-243, Vol. 1
Contract NAS7-100
NASA CR-67617

Descriptors: *Astronomy, *Biophysics, *Lunar exploration, *Manned space flight, *Planetary-interplanetary program, *NASA program.

N66-15848 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
HANDLING QUALITIES FOR PILOT CONTROL OF APOLLO LUNAR-LANDING SPACECRAFT,
by D. C. Cheatham, and C. T. Hackler. 1964, 40p
NASA-TM-X-57138
Presented at the AIAA/NASA Manned Space Flight Meeting, (3rd) Nov 4-6 1964.

Descriptors: *Apollo spacecraft, *Spacecraft control, *Handling quality, *Lunar landing.

N66-16156 **Field 22A**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
VELOCITY REQUIREMENTS FOR THE EARTH RETURN PHASE OF PLANETARY MISSIONS,
by R. M. Jones, and W. T. Stephens. 29 Dec 65, 96p NASA-TM-X-53375

Descriptors: *Reentry physics, *Return-to-earth phase, *Velocity.

N66-16708 **Field 22A**
CFSTI Prices: HC$8.37 MF$2.50
Boeing Co., Seattle, Wash. Aerospace Group.
ORBITAL LAUNCH FACILITY STUDY, VOLUME II-B.
Technical rept. (Final).
Oct 65, 537p D2-82559-2-Vol-2-B
Contract NAS8-11355
NASA CR-67823

Descriptors: *Orbital launch, *Launching facility.

N66-16709 **Field 22A**
CFSTI Prices: HC$3.00 MF$0.75
Boeing Co., Seattle, Wash. Aerospace Group.
ORBITAL LAUNCH FACILITY STUDY, VOLUME I.
Technical rept. summary (Final).
Oct 65, 91p D2-82559-1-Vol-I
Contract NAS8-11355
NASA CR-67657

Descriptors: *Launching facility, *Orbital launch.

N66-16710 **Field 22A**
CFSTI Prices: HC$6.00 MF$1.25
Boeing Co., Seattle, Wash. Aerospace Group.
ORBITAL LAUNCH FACILITY STUDY, VOLUME II.
Technical report. (Final).
Oct 65, 211p D2-82559-2-Vol-2-A
Contract Nas8-11355
NASA CR-67736

Descriptors: *Orbital launch, *Launching facility.

N66-16964 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-space Group.
ORBITAL LAUNCH FACILITY STUDY. VOLUME III. OLF STUDY RESEARCH AND TECHNOLOGY IMPLICATIONS REPORT.
Final rept.
Oct 65, 19p D2-82559-3-Vol-III
Contract NAS8-11355
NASA CR-67667

Descriptors: *Ferry spacecraft, *Interplanetary flight, *Launch complex.

N66-18006 **Field 22A**
CFSTI Prices: HC$5.00 MF$1.25
National Aeronautics and Space Administration, Washington, D. C.
MANNED SPACE-FLIGHT EXPERIMENTS-GEMINI V MISSION.
Interim report.
1966, 195p NASA-TM-X-57244

Descriptors: *Aerospace medicine, *Gemini spacecraft, *Radiometry, *Spectrometry; *Photography.

N66-18183 **Field 22A**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Corp., Ann Arbor, Mich. Bendix Systems Div.
STUDY OF MINERAL STABILITY IN THE LUNAR ENVIRONMENT.
Quarterly progress rept. no. 2, 16 Feb-16 May 65.
May 65, 74p BSR-1139
Contract NAS9-3734
NASA CR-65231

Descriptors: *Mineralogy, *Lunar environment, *Mass spectrometry, *X-ray diffraction.

N66-18184 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
Bendix Corp., Ann Arbor, Mich. Bendix Systems Div.
STUDY OF MINERAL STABILITY IN THE LUNAR ENVIRONMENT.
Quarterly progress rept. no. 3, 16 May-16 Aug 65.
Aug 65, 29p BSR-1175
Contract NAS9-3734
NASA CR-65236

Descriptors: *Rock, *Mineralogy, *X-ray photography, *Lunar environment.

AD-632 761 **See Field 22B**

AD-633 070 **See Field 22B**

AD-633 355 **See Field 6S**

22B. SPACECRAFT

AD-632 761 **Field 22B, 22A, 22C, 3B**
CFSTI Prices: HC$1.00 MF$0.50
TRW Systems, Redondo Beach, Calif.
THE SOVIET SPACE PROGRAM: A SELECTIVE BIBLIOGRAPHY.
Special Literature Survey no. 16,
by L. R. Magnolia. 9 Mar 66, 13p Rept. no. 9990-7235-T0-000
TT 66-61250

Descriptors: (*Space flight, USSR), (*Bibliographies, Space flight), Moon, Weightlessness, Satellites (Artificial), Spacecraft, Space biology, Geophysics.

The bibliography consists of 121 items, arranged alphabetically by author or by the issuing agency.

AD-633 070 **Field 22B, 22A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE SOVIET PLANETARY MISSIONS,
by Merton E. Davies, and Bruce C. Murray.May 66, 26p P-3364

Descriptors: (*Space probes, USSR), (*Lunar probes, USSR), United States, Spacecraft, Flyby, Space navigation.

Identifiers: Zond, Mars probes, Venus probes, Lunik III, Mariner.

Release of information by the Soviets regarding spacecraft design and intended mission profiles of their Venus 2 and 3 flights makes it possible to discern a consistent pattern in their very large planetary exploration effort. (1) As has been the case with their lunar exploration efforts, the Soviets have placed very great emphasis on an early planetary impact with or without return of significant scientific information. (2) They have utilized a standardized flyby bus spacecraft for all planetary attempts since 1962. This vehicle, can substitute a small spherical entry capsule in place of the camera compartment. The capsule is delivered by a bus-deflection maneuver. (3) They evidently have attempted to deploy at least one flyby camera spacecraft and one flyby capsule spacecraft at each Mars and Venus launch window since 1962. (4) None of the flyby attempts has successfully returned data from the planetary encounter. However, failure of the Venus 3 spacecraft system occurred after midcourse correction but before the terminal (bus-deflection) maneuver. As a result, the unsterilized flyby bus impacted the planet. The same circumstances may have caused Zond 1 to impact Venus and Zond 2 to impact Mars. Soviet spacecraft engineering and operation differ greatly from United States practice, which suggests that there has been little transfer of technology between the two programs so far. (Author)

N65-17217 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
Hughes Aircraft Co., El Segundo, Calif. Space Systems Div.
SURVEYOR/CENTAUR AIR CONDITIONING TEST PLAN,
by H. C. Cloud, and R. R. Weiss. 1 Sep 63, 46p
Contracts NAS7 100, JPL950045
NASA CR-60461

Descriptors: (*Air conditioning equipment, Spacecraft).

Identifiers: Surveyor/Centaur.

N65-28464 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
LOW-POWER, LOW-LEVEL ANALOG-TO-DIGITAL CONVERTER FOR SPACE VEHICLE APPLICATIONS,
by John C. Sturman, and Anthony V. Bertolino.
Jul 65, 34p NASA-TN-D-2916

Descriptors: (*Analog-to-digital converters, Spacecraft).

N65-34241 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
APOLLO DIGITAL UP-DATA LINK DESCRIPTION,
by Stuart D. Lenett. Oct 65, 53p
NASA TM-X-1146

Descriptors: (*Digital systems, Spacecraft).

N66-10341 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-35, VOLUME VI FOR THE PERIOD JULY 1, 1965 TO AUGUST 31, 1965. SPACE EXPLORATION PROGRAMS AND SPACE SCIENCES.
30 Sep 65, 49p JPL-SPS-37-35, Vol. VI
Contract NAS7-100
NASA CR-67719

Descriptors: *Space exploration, *Surveyor project, *Test facility, *Deep space instrumentation facility (DSIF), *Mariner program, *Space flight.

N66-11630 Field 22B
CFSTI Prices: HC$7.00 MF$2.00
Advisory Group for Aerospace Research and Development, Paris (France).
SPACE SIMULATION CHAMBERS AND TECHNIQUES,
by B. H. Goethert. Dec 64, 405p AGARDograph-93

Descriptors: (*Space environmental conditions, Simulation), (*Spacecraft, Design).

N66-15514 Field 22B, 4B
CFSTI Prices: HC$3.00 MF$0.75
Technisch Documentatie en-Informatie-Centrum voor de Krijgsmacht, The Hague (Netherlands).
WEATHER SATELLITES. TIROS AND NIMBUS LITERATURE SURVEY.
Jun 65, 74p TDCK-42600

Descriptors: *Bibliography, *Nimbus satellite, *Tiros satellite.

N66-15775 Field 22B
CFSTI Prices: HC$7.83 MF$2.50
Honeywell, Inc., St. Petersburg, Fla. Aeronautical Div.
NASA PATTERN RELEVANCE GUIDE. VOLUME III. TECHNOLOGY DOCUMENT,
by C. W. Benfield. 15 Oct 65, 483p Rept. no. 8-20207-RG-Vol-3
Contract NAS8-20207
NASA CR-69550

Descriptors: *Apollo project, *Space program, *NASA program.

N66-17289 Field 22B
CFSTI Prices: HC$3.00 MF$0.75
Little (Arthur D.), Inc., Cambridge, Mass.
THERMAL SCALE MODELING OF THE TEMPERATURE CONTROL MODEL OF MARINER MARS 64, PHASE II,
by F. Gabron and R. W. Johnson. 25 Jan 65, 84p C-66326
Contract JPL-950789
NASA CR-70178

Descriptors: *Mariner space probe, *Mars space craft, *Scale model, *Temperature distribution.

N66-18339 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
APPLICATION OF INFLATABLE STRUCTURES TO STATION KEEPING OF PASSIVE COMMUNICATIONS SATELLITES,
by J. E. Cooper. 1965, 26p NASA-TM-X-56358
Presented at the Aerospace Expandable Struct. Conf. (2nd), Minneapolis, May 25-27, 1965.

Descriptors: *Communications satellite, *Inflatable structure, *Orbiting satellite, *Passive satellite.

N66-18346 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
LUNAR ORBITER-A PHOTOGRAPHIC SATELLITE,
by G. C. Broome and L. J. Kosofsky. 1965, 41p
NASA-TM-X-56207
Presented at the Spring Conv. of the Soc. of Motion Picture and Television Engr., Los Angeles, Mar 28 - Apr 2, 1965.

Descriptors: *Lunar photography, *Framing camera, *Photographic apparatus, *Surveyor project, *Television transmission.

N66-18348 Field 22B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
NATIONAL AND INTERNATIONAL COOPERATION IN SCIENTIFIC EXPERIMENTS ON FUTURE EARTH-ORBITING SPACECRAFT,
by H. L. Dryden. 1965, 18p NASA-TM-X-56229
Presented to the Am. Astronautical Soc., Washington, D. C., Mar 18, 1965.

Descriptors: *Industry, *Manned space flight, *Space science, *University program.

N66-18364 Field 22B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
PERFORMANCE CHARACTERISTICS OF CONTROL MOMENT GYRO SYSTEMS FOR MANNED ORBITAL LABORATORIES,
by R. W. Will. 1964, 24p NASA-TM-X-56221
Presented at the SAE A-18 Comm. Meeting, Miami, Fla., Dec 8-11, 1964.

Descriptors: *Gyroscope, *Gimballed control, *Manned orbital laboratory (MOL), *Momentum storage, *Stability and control.

N66-18376 Field 22B
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ACHIEVING ARIEL II DESIGN COMPATIBILITY,
by A. C. Davidson and A. L. Franta. 1965, 80p
NASA-TM-X-56215
Presented at the British Interplanet. S9C. Symp. on the Eng. of Sci. Satellites, London, Jan 5, 1965.

Descriptors: *Ariel II satellite, *Electric equipment, *Spacecraft design, *Mechanical system.

N66-18385 Field 22B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
STRUCTURAL CONSIDERATIONS FOR AN EXPANDABLE LENTICULAR SATELLITE,
by J. L. Humble. 1965, 24p NASA-TM-X-56352
Presented at the Aerospace Expandable Struct. Conf. (2nd), Minneapolis, May 25-27 1965.

Descriptors: *Communications satellite, *Expandable structure, *Lenticular body, *Satellite configuration.

N66-18426 Field 22B
CFSTI Prices: HC$8.10 MF$2.50
National Aeronautics and Space Administration, Cleveland, Ohio.
NASA AGENA D MISSION CAPABILITIES AND RESTRAINTS CATALOG, VOLUME II.
1965, 510p NASA-TM-X-52146

Descriptors: *Programming, *Support system, *Manual, *Mission planning.

AD-459 468 See Field 11C

AD-632 679 See Field 17G

AD-632 917 See Field 17B

AD-633 025 See Field 9F

AD-633 076 See Field 20K

AD-633 096 See Field 20K

AD-633 104 See Field 14B

22C. SPACECRAFT TRAJECTORIES AND REENTRY

AD-633 034 Field 22C, 17G
CFSTI Prices: HC$1.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
POSITION ERROR IN STATION-KEEPING SATELLITE.
Technical note,
by Brian J. Moriarty. 1 Apr 66, 16p TN-1966-21
Contract AF 19(628)-5167,
Proj. AF-649L
ESD TR-66-159

Descriptors: (*Synchronous satellites, *Flight control systems), Equatorial orbit trajectories, Attitude control systems, Adaptive control systems, Celestial guidance, Sun, Position finding, Errors, Astronautics.

An automatic station-keeping satellite must be able to measure its deviation from the nominal position. For the system considered here (an equatorial synchronous orbit) this involves a latitude difference measurement between the earth and sun at certain times. This report shows that a combination of an error in satellite orientation and the sun being in a plane other than the equatorial plane may result in errors in position determination. The nature of the errors involved is described and their magnitudes estimated. (Author)

AD-633 239 Field 22C, 3C
CFSTI Prices: HC$2.00 MF$0.50
Naval Postgraduate School, Monterey, Calif.
OBLATENESS-PERTURBED ORBITS BY VELOCITY-CORRESPONDENCE VARIATIONS.
Research paper,
by Willard E. Bleick. 20 Apr 66, 22p RP-65

Descriptors: (*Orbital trajectories, *Celestial mechanics), Perturbation theory, Geophysics, Velocity, Satellites (Artificial).

Identifiers: Oblateness.

This paper presents an elementary treatment of the first order differential effects of the earth's oblateness on a close satellite using the simple notion of a varied orbit. The usual result of this approach is that the radial variation is unbounded for infinite time. The standard method of celestial mechanics for removing this difficulty is to analyze the perturbed orbit as an ellipse whose shape and space orientation are functions of time. It is shown here that the secular term may be avoided more simply by relating points on the varied and unvaried orbits by a type of radial velocity correspondence instead of the usual time correspondence, and by making the varied orbit osculate at a latus rectum chord end point of the unvaried orbit. (Author)

AD-633 406 **Field 22C, 8E**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
DETERMINATION OF THE TRAJECTORY OF A BODY, USING THE SECOND DERIVATIONS OF POTENTIALS,
by V. P. Chulkov-Eyman. Apr 66, 7p TC-1011 TT 66-61372
Opredelenie Traektorii Tela po Vtorym Proizvodnym Potentsiala, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotosemka (USSR) n5 p95-7 1963.

Descriptors: (*Orbital trajectories, Determination), (*Potential theory, Orbital trajectories), Model theory, USSR.

The press reports of recent years mention the attempts to use the earth's gravity field for the orientation of space ships. According to the published data, the attainable orientation accuracy is of an order of 1-2 min. As data units of different kinds, the control systems use the inertia systems which measure certain linear functions of second derivations of the potential. The accuracy of measurements amounts to 10 to the -4 of the measured value. In the present article it is shown that the measurement of the second derivations of potential can be used not only for the purposes of orientation, but also for the determination of a trajectory of the body. The demonstration is carried out with the aid of two idealized models. (Author)

N65-20978 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
EFFECTS OF RADIATION FORCES UPON THE ATTITUDE OF AN ARTIFICAL EARTH SATELLITE,
by Thomas F. Clancy, and Thomas P. Mitchell.Sep 62, 83p CRSR-129
Grant NsG-184-60
NASA CR-57791

Descriptors: (*Artificial earth satellites, Attitude), (*Radiation effects, Satellite vehicles).

N66-10046 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
SATELLITE MOTION FOR ALL INCLINATIONS AROUND AN OBLATE PLANET,
by M. Eckstein, J. Kevorkiam, and Y. Shi. Aug 64, 57p
Contract NAsw-901, Grant AF-AFOSR-62-256
NASA CR-67598
Prepared for presentation at IAU Symp., Thessaloniki, Greece, 17-22 Aug 64, paper no. 3078.

Descriptors: *Inclination, *Oblateness, *Spacecraft motion, *Planet.

N66-10050 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
THE APPLICATION OF FLOQUET THEORY TO THE COMPUTATION OF SMALL ORBITAL PERTURBATIONS OVER LONG TIME INTERVALS USING THE TSCHAUNER-HEMPEL EQUATIONS,
by B. O. Lange, and R. G. Smith. Aug 65, 74p
SUDAER-241
Grant NsG-582
NASA CR-67578

Descriptors: *Perturbation theory, Satellite orbit, *Spacecraft trajectory.

N66-15820 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshal Space Flight Center.
LAUNCH WINDOWS FOR TWO TYPES OF ORBITS SYNCHRONOUS WITH THE LUNAR PERIOD,
by E. H. Bauer, and L. D. Mullins. 1 Nov 65, 48p
NASA-TM-X-53354

Descriptors: *Centaur launch vehicle, *Orbit calculation, *Earth-moon system, *Launch window, *Lunar phase, *Saturn launch vehicle.

N66-16799 **Field 22C**
CFSTI Prices: HC$5.00 MF$1.00
Massachusetts Inst. of Tech., Cambridge.
CORRELATION OF INTERPLANETARY GEOMETRY WITH PROPULSION REQUIREMENTS FOR OPTIMAL LOW-THRUST MISSIONS.
Master's thesis,
by N. A. Carlson. Feb 65, 165p TE-12
Grant NsG-254-62
NASA CR-62005

Descriptors: *Ballistic trajectory, *Correlation function, *Interplanetary trajectory, *Low thrust propulsion, *Mission planning.

N66-17278 **Field 22C**
CFSTI Prices: HC$6.00 MF$1.25
Space Technology Labs., Inc., Redondo Beach, Calif.
DIFFERENTIAL CORRECTION AND PRELIMINARY ORBIT DETERMINATION FOR LUNAR SATELLITE ORBITS,
by D. S. Ingram, P. A. Lavoie, and D. H. Lewis.1 Dec 65, 212p STL-2852-6010-RO-000
Contract NAS1-4605
NASA CR-66038

Descriptors: *Lunar satellite, *Satellite orbit calcula tion, *Trajectory analysis.

N66-18307 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
BOUNDARY VALUE PROBLEMS ASSOCIATED WITH OPTIMIZATION THEORY,
by H. L. Ingram. 3 Dec 65, 61p NASA-TM-X-53365

Descriptors: *Algebra, *Trajectory optimization, *Boundary value problem, *Numerical analysis, *Problem solving.

N66-18309 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE THEORY OF LONG-TERM BEHAVIOR OF ARTIFICIAL SATELLITE ORBITS DUE TO THIRD-BODY PERTURBATIONS,
by J. Lorell and R. R. Williams. 15 Feb 66, 53p
JPL-TR-32-916
Contract NAS7-100
NASA CR-70738

Descriptors: *Elliptic integral, *Satellite, *Nonlinear equation, *Satellite perturbation, *Three-body problem.

N66-18438 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
E GO LAUNCH WINDOW STUDY,
by H. E. Montgomery. 1 Jan 63, 35p NASA-TM-X-55413, X-643-62-225

Descriptors: *Ego, *Restraint, *Launch window.

AD-632 761 **See Field 22B**

AD-633 006 **See Field 8E**

AD-633 054 **See Field 17I**

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

N66-15766 **Field 22D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, George C. Marshall Space Flight Center, Huntsville, Ala.
SATURN V VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP MEETING,
by J. C. Glover. 9 Jul 63, 108p NASA-TM-X-57122, M-P and VE-VA-163-63

Descriptors: *Environmental control, *Weight analysis, *Saturn V launch vehicle, *Structural design.

N66-17280 **Field 22D**
CFSTI Prices: HC$6.00 MF$1.25
LTV Astronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
TUNNEL MOUNTED AUTO DESTRUCT MODULE SCOUT VEHICLE,
by M. E. Jarrell, B. V. Morris, and C. W. Payne.15 Sep 65, 220p Rept. no. 23.205
Contract NAS1-3889
NASA CR-66044

Descriptors: *Electronic module, *Stage separation, *Destruction, *Scout launch vehicle.

N66-17567 **Field 22D**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
STATIC LOAD TESTS ON RESEARCH AND DEVELOPMENT, ATLAS VEHICLE LAUNCHER,
by H. Neal. 1966, 39p NASA-TM-X-52169

Descriptors: *Atlas launch vehicle, *Fracture, *Load test, *Missile launcher.

AD-632 990 **See Field 5A**

* U.S. GOVERNMENT PRINTING OFFICE : 1966 OL—252-085 (1)

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UNSTEADY GASDYNAMIC PROBLEMS RELATED TO FLIGHT VEHICLES

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03 ASTRONOMY AND ASTROPHYSICS

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GH 977 4 FIELD 3A,20J, 5A

RENSSELAER POLYTC INST, GRADUATE SCHOOL, PHYSICS, NEW YORK

MODELS OF INTERSTELLAR DUST CLOUDS AND EXTINCTION AND POLARIZATION IN THE ULTRAVIOLET

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STEADY STATE INTERACTION BETWEEN RADIATION AND MATTER IN STELLAR ATMOSPHERES

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INVESTIGATIONS OF COSMIC RAYS, NEUTRONS, AND INTERPLANETARY PLASMA IN THE SOLAR SYSTEM

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DOD-ARMY

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R. S. COLVIN

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STABILITY OF STELLAR MODELS

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GQF 4344 FIELD 3A, 3B,20H, 7D

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MEASUREMENT OF GAMMA RAY SPECTRUM OF SUPERNOVA REMNANTS

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04 ATMOSPHERIC SCIENCES

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INVESTIGATIONS AND STUDIES OF ELECTRON DENSITY AND COLLISION FREQUENCY IN THE LOWER IONOSPHERE - D AND E REGIONS

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MICROWAVE SPECTROSCOPY IN THE MILLIMETER REGION

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LIGHT EMITTED BY ATOMIC FLAMES

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BETWEEN HYDROGEN AND OXYGEN

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GQF 3376 2 FIELD 7A,20M,20J

HOWARD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, DIST OF COLUMBIA

INFRARED SPECTRA OF COMPRESSED GASEOUS MIXTURES

G. C. TURRELL

AF-AFOSR-0167-65
/65- /

DOD-AIR FORCE

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GQF 3387 2 FIELD 7C, 7A, 7D

OREGON STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, OREGON

OXIDATION-REDUCTION REACTIONS OF ORGANIC SULFUR COMPOUNDS

J. L. KICE

AF-AFOSR-0106-65
/65- /

DOD-AIR FORCE

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GQF 3408 2 FIELD 7C, 7D

GEORGE WASHINGTON UNIV, SCHOOL OF ENGINEERING, DIST OF COLUMBIA

RING EXPANSION

G. L. BUCHANAN

AF-EOAR-0036-63
/65- /

DOD-AIR FORCE

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GQF 3415 2 FIELD 7C, 7A, 7D

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, CHEMISTRY, IDAHO

REARRANGEMENTS OF CARBONIUM IONS AND FREE RADICALS IN THE BICYCLO /3.1.0/ HEXYL SYSTEM

P. K. FREEMAN

AF-AFOSR-0034-65
/65- /

DOD-AIR FORCE

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GQF 3446 2 FIELD 7C, 7D, 7A, 9+

MICROWAVE SPECTROSCOPY IN THE MILLIMETER REGION

D. M. LARKIN

AF-EOAR-0019-63
/65- /

DOD-AIR FORCE

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GQF 3489 2 FIELD 7D, 7C, 7A,20J

,PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

COORDINATION KINETICS OF MULTIDENTATE LIGANDS COMPLEXES

D. W. MARGERUM

AF-AFOSR-0134-65
/65- /

DOD-AIR FORCE

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GQF 3529 2 FIELD 7C, 7D, 7A,20J

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

MOLECULAR STRUCTURE OF CARBANIONS AND THE KINETICS OF THEIR EXCHANGE PROCESS IN SOLUTION

G. FRAENKEL

AF-AFOSR-0251-65
/65- /

DOD-AIR FORCE

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GQF 3549 FIELD 7D, 7A, 7B

CASE INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, OHIO

PHOTO-INDUCED REDOX REACTIONS

J. K. KOCHI

AF-AFOSR-0226-63
/65- /

DOD-AIR FORCE

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GQF 3595 2 FIELD 7C, 7A, 7D, 7B

VIRGINIA POLYTECH INST, GRADUATE SCHOOL, CHEMISTRY, VIRGINIA

OXIDATION OF ARSENIC /III/ AND ANTIMONY /III/

J. G. MASON

AF-AFOSR-0210-65
/65- /

DOD-AIR FORCE

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GQF 3600 1 FIELD 7C, 7D,12A

UNIV OF WISCONSIN, GRADUATE SCHOOL, CHEMISTRY, WISCONSIN

STERIC EFFECTS IN CONJUGATED SYSTEMS

J. A. BERSON

AF-AFOSR-0389-63
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DOD-AIR FORCE

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GQF 3608 2 FIELD 7D, 7C, 7A,20J

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

RATES OF EXCHANGE OF SOLVENT MOLECULES WITH PARAMAGNETIC IONS

T. R. STENGLE, J. W. LANGFORD

AF-AFOSR-0212-65
/65- /

DOD-AIR FORCE

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GQF 3734 1 FIELD 7C, 7D, 7A,20M

UNIVERSITY OF UTAH, GRADUATE SCHOOL, CHEMISTRY, UTAH

LASER TEMPERATURE-JUMP STUDIES OF FAST REACTIONS

E. M. EYRING

AF-AFOSR-0476-64
/65- /

DOD-AIR FORCE

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GQF 3789 1 FIELD 7C, 7D, 7B

LOUISIANA ST UNIV A+M, GRADUATE SCHOOL, CHEMISTRY, LOUISIANA

DISPLACEMENT REACTIONS BY FREE RADICALS ON S-S AND O-O BONDS

W. A. PRYOR

AF-AFOSR-0540-64
/65- /

DOD-AIR FORCE

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GQF 3827 FIELD 5A,12A,20J

QUANTUM CHEMISTRY PROGRAM EXCHANGE

H. SHULL

AF-AFOSR-0767-65
/65- /

DOD-AIR FORCE

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GQF 3837 FIELD 7A, 7D,20J

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CHEMISTRY + CHEM ENGIN, CALIFORNIA

TRANSFER OF EXCITATION IN SOLUTION

G. S. HAMMOND

AF-49-638-01479
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DOD-AIR FORCE

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GQF 3941 FIELD 7C, 7D

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

MULTICHARGE AROMATIC IONS

M. A. BATTISTE

AF-AFOSR-0738-65
/65- /

DOD-AIR FORCE

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GQF 3349 FIELD 7C, 7D,20J, 7B

UNIVERSITY OF IOWA, GRADUATE SCHOOL, CHEMISTRY, IOWA

REACTIONS AND STRUCTURES OF METAL-OLEFIN COMPLEXES AND RELATED SUBSTANCES

J. R. DOYLE, W. C. BAENZIGER

AF-AFOSR-0763-65
/65- /

DOD-AIR FORCE

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GQF 3919 FIELD 7C, 7D,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

REACTIONS OF MOLECULES IN EXCITED ELECTRONIC STATES WITH PARAMAGNETIC GASES

W. A. NOYES

AF-AFOSR-0778-65
/65- /

DOD-AIR FORCE

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GQF 4349 FIELD 20J,20F,20L

WESTINGHOUSE ELECTRIC, MARYLAND

HIGH FREQUENCY PARAMAGNETIC RESONANCE STUDIES

D. MERGERIAN

AF-49-638-01537
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DOD-AIR FORCE

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GQF 4360 FIELD 7D,20J,20F,20L

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, CHEMISTRY, MICHIGAN

THE EXCITED STATES OF URANIUM AND HEAVY METALS

T. DUNN

AF-AFOSR-0865-65
/65- /

DOD-AIR FORCE

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GQF 4369 FIELD 7C, 7D, 7B

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

PHOTOCHEMICAL GENERATION OF DIVALENT CARBON DERIVATIVES

A. PADWA

AF-AFOSR-0820-65
/65- /

DOD-AIR FORCE

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GQF 4386 FIELD 7C, 7A, 7D,20M

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

VAPOR PHASE CALORIMETRY

J. D. PARK, J. R. LACHER

AF-AFOSR-0810-65
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DOD-AIR FORCE

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GQF 4407 FIELD 5A,20J, 7B

NATL ACAD SCI NAT RE, DIST OF COLUMBIA

RESEARCH ON INORGANIC CHEMICAL NOMENCLATURE

E. WICHERS

AF-AFOSR-0890-65
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DOD-AIR FORCE

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GQF 4413 FIELD 7C, 7D,20J, 7B

UNIV OF SOUTHERN CALIF, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

MICROWAVE SPECTROSCOPY OF BORON COMPOUNDS

R. A. BEAUDET

AF-AFOSR-0849-65
/65- /

DOD-AIR FORCE

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GQF 4416 FIELD 7C, 7A, 7D

LEHIGH UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

NUCLEOPHILIC DISPLACEMENTS BY ORGANOPHOSPHORUS COMPOUNDS

I. J. BOROWITZ

AF-AFOSR-0938-65
/65- /

DOD-AIR FORCE

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GQF 4463 FIELD 7C, 7D

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, CHEMISTRY, IDAHO

REARRANGEMENTS OF CARBONIUM IONS AND FREE RADICALS IN THE BICYCLO /3.1.0/ HEXYL SYSTEM

P. K. FREEMAN

AF-AFOSR-0875-65
/65- /

DOD-AIR FORCE

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GQF 4472 FIELD 7C, 7D, 7B

WEIZMANN INST OF SCI, ISRAEL

MECHANISM OF NITROGEN FIXATION BY ULTRASONIC RADIATION IN WATER

M. ANBAR

AF-EOAR-0087-65
/65- /

DOD-AIR FORCE

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GQF 4494 FIELD 7C,21B,21I,20M

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THERMODYNAMICS OF ORGANIC DERIVATIVES OF THE LIGHTER ELEMENTS

D. R. DOUSLIN

ISSA-00007-65
/65- /

DOD-AIR FORCE

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GQF 4518 FIELD 7C, 7D,20J, 7B

UNIV OF CHILE, CHILE

STUDY OF CYCLOPROPANE DERIVATIVES CONTAINING FLUORINE

F. CASES

AF-AFOSR-0892-65
/65- /

DOD-AIR FORCE

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GQF 4523 FIELD 7A, 7D,20J

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

CHEMICAL REACTIONS USING MODULATED ATOMIC BEAM TECHNIQUES

J. N. SMITH

AF-49-638-01559
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DOD-AIR FORCE

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ZUG 544 1 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, BOULDER CITY, NEVADA

RECOVERY OF VALUABLES FROM CHLORINATION RESIDUES

D. D. BLUE, J. R. HETTLE

INT-BM-4158-1-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 545 1 FIELD 7D,13H, 7B

USDI, BUR MINES, RENO, NEVADA

PREPARATION OF METAL PHOSPHIDES

D. H. BAKER, T. R. GRAHAM

INT-BM-4158-14
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INTERIOR-BUREAU OF MINES

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ZUG 546 1 FIELD 7C, 7D,13H, 7B

USDI, BUR MINES, S.L.C., UTAH

FLOTATION FUNDAMENTALS

B. H. CLEMMONS, W. W. AGEY, J. V. BATTY
A. S. PECK, G. H. POTTER, H. B. SALISBURY

INT-BM-4160-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 549 1 FIELD 11G,13H

USDI, BUR MINES, S.L.C., UTAH

SOLVENT EXTRACTION RESEARCH

B. H. CLEMMONS, S. R. BORROWMAN
S. R. CRANE, D. R. GEORGE

INT-BM-4160-9
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INTERIOR-BUREAU OF MINES

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ZUG 562 1 FIELD 21D, 7D,20M, 8D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

CHANGING PHASE RELATIONSHIPS TO AID RECOVERY OF FLUIDS

C. K. EILERTS, B. A. BAKER, N. L. POTTS

INT-BM-2971
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INTERIOR-BUREAU OF MINES

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ZUG 573 1 FIELD 7C,21D, 7A, 7D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

PRESSURIZED FIXED-BED GAS PRODUCER

J. H. FABER, J. +. FABER, R. L. GALL
A. S. MOORE

INT-BM-11-4182-14
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 577 1 FIELD 7C, 7A, 7D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SELECTIVE SOLVENTS FOR CO2 AND H2S IN THE PRESENCE OF H2, CO, AND CH4

J. H. FIELD, W. P. HAYNES, J. LIPOVSIK

INT-BM-4185-11
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 579 1 FIELD 21D, 7D,20M, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

PRODUCTION OF HYDROGEN FROM COAL

J. H. FIELD, W. P. HAYNES

J. W. MULVIHILL

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INTERIOR-BUREAU OF MINES

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ZUG 580 1 FIELD 21D, 7D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

GASIFICATION OF COAL USING EXTERNAL HEAT AND CATALYSTS

J. H. FIELD, W. P. HAYNES

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INTERIOR-BUREAU OF MINES

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ZUG 594 1 FIELD 7D, 7A,20M,11F

USDI, BUR MINES, ALBANY, OREGON

VAPOR PRESSURE OF MOLTEN REACTIVE METALS

A. H. ROBERSON, R. A. BEALL
E. D. CALVERT, R. K. KOCH

INT-BM-4156-156
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INTERIOR-BUREAU OF MINES

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ZUG 608 1 FIELD 7D,20J, 7B

USDI, BUR MINES, RENO, NEVADA

ACTIVATION ANALYSIS RESEARCH

H. H. HEADY, T. R. GRAHAM

INT-BM-4158-18
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INTERIOR-BUREAU OF MINES

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ZUG 609 1 FIELD 7D, 5A,12A, 7B

USDI, BUR MINES, ROLLA, MISSOURI

VAPOR PRESSURE OF HALIDES

J. W. JENSEN, L. C. GEORGE
R. L. REYNOLDS, A. VISNAPUU

INT-BM-4162-G
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INTERIOR-BUREAU OF MINES

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ZUG 623 1 FIELD 21D, 7A, 7D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

PYROLYSIS OF COAL IN GASEOUS MEDIA - K INETICS OF STEAM-COAL REACTION

J. J. SEBASTIAN, R. J. BELT, F. R. BROWN
J. P. SEBASTIAN

INT-BM-11-4182-8
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INTERIOR-BUREAU OF MINES

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ZUG 624 1 FIELD 7D,20J, 5A, 7B

USDI, BUR MINES, AMARILLO, TEXAS

METASTABLE LEVELS IN HELIUM GROUP ELEMENTS IN A CONDENSED PHASE

L. STROUD, E. H. GILMORE, T. O. MEYER

INT-BM-4336
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INTERIOR-BUREAU OF MINES

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ZUG 625 1 FIELD 21D, 5A, 7B

USDI, BUR MINES, AMARILLO, TEXAS

ISOTOPIC ABUNDANCE OF CERTAIN ELEMENTS IN HELIUM-BEARING NATURAL GASES

L. STROUD, T. O. MEYER

INT-BM-4782
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INTERIOR-BUREAU OF MINES

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ZUG 626 1 FIELD 7C, 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

PHASE EQUILIBRIA AT TEMPERATURES TO 5 DEGREES K

P. C. TULLY, W. E. DEVANEY, J. M. ESTES
J. C. MEEKS

INT-BM-4333
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INTERIOR-BUREAU OF MINES

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ZUG 683 1 FIELD 7C, 7D,20L, 7B

USDI, BUR MINES, NORRIS, TENNESSEE

SYNTHETIC MINERALS AND COMPOUNDS CONTAINING GERMANIUM AS A SUBSTITUTE FOR SILICON

F. O. LAMB, F. P. LAMB, N. A. PACE
H. R. SHELL

INT-BM-4167-6
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INTERIOR-BUREAU OF MINES

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ZUG 686 1 FIELD 7C,21D, 7D, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

REACTIONS OF COAL WITH REACTIVE SPECIES FROM AN ELECTRICAL DISCHARGE

I. WENDER, B. D. BLAUSTEIN, W. A. STEINER

INT-BM-4185-8C
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INTERIOR-BUREAU OF MINES

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ZUG 688 1 FIELD 7D,21D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

DEVELOPMENT AND APPLICATION OF ANALYTICAL METHODS

C. C. WARD, J. E. DOOLEY, B. H. ECCLESTON
D. E. HIRSCH, R. F. KENDALL

INT-BM-6-1112-1220-5
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INTERIOR-BUREAU OF MINES

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ZUG 704 1 FIELD 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

CRYOGENIC CHROMATOGRAPHY

C. L. KLINGMAN, A. L. PURER

INT-BM-4784
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INTERIOR-BUREAU OF MINES

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ZUG 718 1 FIELD 19D,20M

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

DEVELOPMENT OF NEW METHODS OF EVALUATING HAZARDOUS CHEMICALS

C. M. MASON, D. R. FORSHEY

INT-BM-3273-G
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INTERIOR-BUREAU OF MINES

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ZUG 751 1 FIELD 7C, 7A, 7D,11F

USDI, BUR MINES, ALBANY, OREGON

PREPARATION OF ORGANOMETALLIC COMPOUNDS

F. E. BLOCK, S. D. HILL, S. B. KNAPP
B. D. NASH

INT-BM-4156 (11)
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INTERIOR-BUREAU OF MINES

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ZUG 772 1 FIELD 7C, 7D,21D, 7A

USDI, BUR MINES, LARAMIE, WYOMING

REACTIONS OF SHALE-OIL COMPONENTS

A. W. DECORA, G. L. COOK, G. U. DINNEEN
I. A. JACOBSON, E. B. SMITH

INT-BM-1593-B3
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INTERIOR-BUREAU OF MINES

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ZUG 773 1 FIELD 7C, 7D

USDI, BUR MINES, LARAMIE, WYOMING

CHARACTERIZATION OF OIL-SHALE PRODUCTS

G. U. DINNEEN, J. J. DUVALL
J. R. MORANDI, R. E. POULSON

INT-BM-1593-B-2
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INTERIOR-BUREAU OF MINES

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ZUG 775 1 FIELD 7C, 7D,21D, 8D

USDI, BUR MINES, LARAMIE, WYOMING

SPECTROSCOPIC METHODS RESEARCH

G. L. COOK, G. U. DINNEEN, D. G. EARNSHAW
F. R. MCDONALD

INT-BM-1593-B4
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INTERIOR-BUREAU OF MINES

08 EARTH SCIENCES AND OCEANOGRAPHY

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GPE 386 7 1 FIELD 8D, 8G, 8C, 7B

UNIVERSITY OF MIAMI, DIVISION OF RESEARCH, MARINE LAB, FLORIDA

THE GEOCHEMISTRY OF RADIOACTIVE ELEMENTS IN THE MARINE ENVIRONMENT

F. F. KOCZY, P. S. ANTAL, S. J. NISKIN
H. G. OSTLUND

AT-40-1-2411
12/64-12/65

AEC-BIOLOGY + MEDICINE

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GQA 323 2 FIELD 4A,20D

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, MICHIGAN

INVESTIGATION OF FLUID-MECHANICS PROBLEMS

RELATED TO GEOPHYSICAL PHENOMENA

C. S. YIH

DA-ARO-D-31-124-G386
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DOD-ARMY

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GQF 2786 4 FIELD 8F

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, GEOLOGY + MINERALOGY, MICHIGAN

EVALUATION OF GEOPHYSICS RESEARCH PROGRAM

J. T. WILSON

AF-49-638-01482
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DOD-AIR FORCE

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GQF 2987 4 FIELD 8G, 8K, 8+, 9+

RCA RES LAB, PRINCETON, NEW JERSEY

AN ANALYSIS OF FACTORS LIMITING SEISMIC DETECTOR SENSITIVITY

D. S. MCCOY

AF-49-638-01436
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DOD-AIR FORCE

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GQF 3190 3 FIELD 8G

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, GEOLOGY, TEXAS

INVESTIGATION OF THE BURIED CRUST OF THE NORTH AMERICAN CONTINENT

W. R. MUEHLBERGER

AF-49-638-01115
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DOD-AIR FORCE

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GQF 3337 3 FIELD 8K, 8G

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, NEVADA

STUDY OF THE SEISMICITY FAULTING + CRUSTAL STRUCTURE WITHIN THE NEVADA BASIN - RANGE PROVINCES

D. B. SLEMMONS

AF-AFOSR-0646-64
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DOD-AIR FORCE

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GQF 3392 2 FIELD 8K, 5A

ST. LOUIS UNIVERSITY, SCHOOL OF ENGINEERING, GEOPHYS + GEOPHYS ENGR, MISSOURI

S WAVE PROJECT FOR FOCAL MECHANISM STUDIES

W. V. STAUDER

AF-AFOSR-0458-62
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DOD-AIR FORCE

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GQF 3452 5 FIELD 3A, 8K

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, CALIFORNIA

STUDY OF SEISMIC PHENOMENA CONNECTED WITH EARTHQUAKES AND EXPLOSIONS

F. PRESS

AF-49-638-01367
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DOD-AIR FORCE

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GQF 3453 4 FIELD 8K, 8G

UNIV OF CAL-L. A., GRADUATE SCHOOL, GEOPHYS + PLANET PHYS, CALIFORNIA

NATURE OF SURFACE WAVE PROPAGATION IN CRYSTAL STRUCTURE OF VARYINGTHICKNESS

L. KNOPOFF

AF-AFOSR-0710-65
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DOD-AIR FORCE

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GQF 3455 5 FIELD 8K, 8G

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, MICHIGAN

COLLECTION AND ANALYSES OF SEISMIC WAVE PROPAGATION DATA

D. WILLIS

AF-49-638-01170
/65- /

DOD-AIR FORCE

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GQF 3627 4 FIELD 8K

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, CALIFORNIA

THE CENTRAL CALIFORNIAN LARGE-SCALE SEISMIC ARRAY

B. A. BOLT

AF-49-638-01506
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DOD-AIR FORCE

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GQF 3635 2 FIELD 8G, 8+, 9+, 9A

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, NEW YORK

USE OF OPTICAL MASERS AS TRANSDUCERS FOR PENDULUM AND STRAIN SEIS-MOGRAPHS

L. E. ALSUP

AF-AFOSR-0283-63
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DOD-AIR FORCE

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GQF 4040 1 FIELD 8G

UNIV OF DURHAM, UNITED KINGDOM

SPECIALIZED CRUSTAL STRUCTURE STUDIES IN GREAT BRITAIN

M. H. BOTT

AF-61-052-00733
/65- /

DOD-AIR FORCE

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GQF 4489 - FIELD 8K, 8H

GRAD RES CTR OF S-WEST, TEXAS

A CO-OPERATIVE ONSHORE-OFFSHORE SEISMIC EXPERIMENT

A. L. HALES

AF-49-638-01542
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DOD-AIR FORCE

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ZUG 563 1 FIELD 8D, 8G

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

DETERMINING MOBILITY OF MULTIPHASE FLUIDS

C. K. EILERTS, J. D. HAM, N. L. POTTS

INT-BM-4368
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 564 1 FIELD 19D, 8D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

HIGH EXPLOSIVES TO INCREASE PETROLEUM RECOVERY BY ROCK FRACTURING

W. E. ECKARD, J. L. CASTAGNO, J. L. EAKIN J. S. MILLER

INT-BM-4817
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 568 1 FIELD 7C,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

METHANE DRAINAGE - GEOLOGICAL STRUCTURAL CONTROL

M. DEUL, P. W. JERAN, R. R. MCLELLAN L. F. MONELL, B. C. PARKS

INT-BM-4362-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 569 1 FIELD 7C,21D, 8D, 8G

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

METHANE DRAINAGE - PHYSICAL CONSTANTS OF COAL AND RELATED GASES

M. DEUL, J. CERVIK

INT-BM-4362-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 570 1 FIELD 7C,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

METHANE DRAINAGE - ENGINEERING FIELD STUDIES

M. DEUL, W. M. MERRITTS, L. P. MOKWA

INT-BM-4362-4
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 574 1 FIELD 8D, 8G,12A, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

COAL PETROGRAPHY

S. ERGUN, J. T. MCCARTNEY, W. VANBUREN

INT-BM-4185-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 595 1 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

EVALUATION OF A NEW COPPER DEPOSIT

S. W. HAZEN

INT-BM-6111521-9C
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 596 1 FIELD 8D,12A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, EFFECT OF UNEQUAL SAMPLE INTERVAL ON GRADE AND TONNAGE OF ORE

S. W. HAZEN

INT-BM-4142-G-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 597 1 FIELD 8D,12A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, EFFECT OF UNEQUAL SAMPLE INTERVALS ON TREND IN GRADE OF ORE

S. W. HAZEN

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/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 599 1 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - EVALUATION OF MINERAL DEPOSITS, SAMPLING LOW-GRADE MINERALIZATION

G. S. KOCH, S. W. HAZEN

INT-BM-4142-F-5
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INTERIOR-BUREAU OF MINES

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ZUG 602 1 FIELD 8D,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, PROBABILITY MODELS

S. W. HAZEN

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/66- /

INTERIOR-BUREAU OF MINES

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ZUG 627 1 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, SAMPLE PREPARATION

D. MICKLE, R. D. BERKENKOTTER

INT-BM-4142-H-5
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 628 1 FIELD 8D,12A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLING RESEARCH - QUALITY CONTROL IN OPEN PITS

D. G. MICKLE

INT-BM-4142-H-3
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 629 1 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, CAR LOT SAMPLING

D. G. MICKLE, R. D. BERKENKOTTER

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/66- /

INTERIOR-BUREAU OF MINES

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ZUG 630 1 FIELD 8D,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SAMPLE RESEARCH, SAMPLE RELIABILITY

D. MICKLE

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/66- /

INTERIOR-BUREAU OF MINES

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ZUG 631 1 FIELD 8D, 8G

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

PERFORMANCE OF LOW PERMEABLE OIL RESERVOIRS IN MID-CONTINENT AREA

W. E. ECKARD, K. H. JOHNSTON

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/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 632 1 FIELD 8D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

KANSAS-OKLAHOMA WATERFLOOD ASSOCIATION ANNUAL TOURS

W. E. ECKARD, K. H. JOHNSTON

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INTERIOR-BUREAU OF MINES

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ZUG 635 1 FIELD 8D, 8G

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

PHYSICAL AND CHEMICAL PARAMETERS EFFECTING FLUID FLOW THROUGH ROCK

R. D. THOMAS, A. D. BROWNLOW
D. R. THOMPSON

INT-BM-3724
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 636 1 FIELD 8D, 8G

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

INFLUENCE OF DISSOLVED GASES ON THE PERMEABILITY OF GEOLOGIC FORMATIONS

R. D. THOMAS, A. D. BROWNLOW
D. R. THOMPSON

INT-BM-4622
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 637 1 FIELD 8D, 8G

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

CAUSES AND REDUCTION OF FORMATION PLUGGING

R. D. THOMAS, A. DOUGLAS, D. R. THOMPSON

INT-BM-4623
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 638 1 FIELD 8G, 8D, 5A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - FULL-SCALE DESIGN OF AN OPEN-PIT MINE SLOPE

D. W. WISECARVER, P. N. HALSTEAD
R. H. MERRILL, S. UTTER, J. B. WILLIAMS

INT-BM-4009-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 639 1 FIELD 8F, 8G

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - EXAMPLE ROCK SLOPES

P. N. HALSTEAD, S. UTTER

INT-BM-4142-L
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 640 1 FIELD 8G, 8D, 5A

USDI, BUR MINES, SPOKANE, WASHINGTON

HYDRAULIC STOPE FILL -- USE OF RADIOISOTOPE-CONTAINING INSTRUMENTS

W. R. WAYMENT, J. G. MCCASLIN
D. F. STAFFORD

INT-BM-14-4140-1
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 641 1 FIELD 13B, 8D

USDI, BUR MINES, SPOKANE, WASHINGTON

HYDRAULIC STOPE FILL -- COMPACTION

D. E. NICHOLSON, R. C. BATES, R. A. BUSCH
W. R. WAYMENT

INT-BM-14-4140-2
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 642 1 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - EXPERIMENTAL STRESS ANALYSIS OF OPEN-PIT SLOPES

A. J. RAMBOSEK, S. UTTER, J. B. WILLIAMS

INT-BM-4142-N
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 643 1 FIELD 8G, 8D, 5A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - SLOPE FAILURE WARNING

DEVICES - SLOPE STRENGTH

S. UTTER, C. H. ASPIN, J. G. MACDONALD

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/66- /

INTERIOR-BUREAU OF MINES

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ZUG 644 1 FIELD 8D,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - EVALUATION OF MINERAL DEPOSITS - STATISTISTICAL RESPONSE SURFACES

R. F. HEWLETT, S. W. HAZEN, R. +. HEWLETT

INT-BM-4142-F-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 646 1 FIELD 8D

USDI, BUR MINES, DENVER, COLORADO

TO COMPARE OPEN-PIT VERSUS UNDERGROUND METHODS OF MINING OIL SHALE

D. E. REDMON, G. SCHOTTLER

INT-BM-4142-J-4
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INTERIOR-BUREAU OF MINES

****

ZUG 647 1 FIELD 8D, 5C, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - MINE SYSTEMS ANALYSIS, MAXIMIZING ESTIMATED RETURNS FROM MINE PRODUCTS

D. E. REDMON

INT-BM-4142-J-2
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INTERIOR-BUREAU OF MINES

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ZUG 648 1 FIELD 8D, 5C, 8E

USDI, BUR MINES, DENVER, COLORADO

USE OF CRITICAL PATH SCHEDULING IN MINE PRODUCTION PLANNING

D. E. REDMON, A. J. MATHIAS

INT-BM-4142-J-1
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 649 1 FIELD 8D, 5C, 8E,12A

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH, MINE SYSTEMS ANALYSIS, FACTORS IN DECISION PROCESSES

D. E. REDMON, T. JOHNSON

INT-BM-4142-J-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 650 1 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

PHYSICS OF EARTH STRUCTURES + STRUCTURAL STUDIES

J. B. WERTZ, H. TRUEBE

INT-BM-4142-K-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 651 1 FIELD 8D, 8G

USDI, BUR MINES, DENVER, COLORADO

STRUCTURAL FACTORS RELATED TO MINING DISTRICTS

J. B. WERTZ

INT-BM-4142-K-4
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 652 1 FIELD 8D, 8G,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - PHYSICS OF EARTH STRUCTURES, STRUCTURAL PROBLEMS RELATED TO MINERALIZATION TRENDS

J. B. WERTZ

INT-BM-4142-K-5
/66- /

INTFRIOR-BUREAU OF MINES

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ZUG 653 1 FIELD 8D, 8G

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - PHYSICS OF EARTH STRUCTURE - STRUCTURAL STUDIES, REGIONAL STRUCTURAL FACTORS

J. B. WERTZ

INT-BM-4142-K-6
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 654 1 FIELD 8D, 8G,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MATHEMATICAL ANALYSIS OF PRODUCTION AND DEPOSIT LOCATIONS

J. B. WERTZ, R. WILHOT

INT-BM-4142-K-2
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INTERIOR-BUREAU OF MINES

****

ZUG 655 1 FIELD 8D,12A, 8E

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - PHYSICS OF EARTH STRUCTURE - STRUCTURAL STUDIES, PATTERN RECOGNITION

J. B. WERTZ, N. YABE

INT-BM-4142-K-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 657 1 FIELD 8F, 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK DRILLABILITY FOR MILITARY APPLICATIONS

J. PAONE, H. UNGER

INT-BM-4374
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 658 1 FIELD 8G

USDI, BUR MINES, COLLEGE PK, MARYLAND

IN PLACE DETERMINATION OF ROCK PROPERTIES

L. A. PANEK, R. L. LAPPI, C. K. QUAN

INT-BM-4144-7C
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 660 1 FIELD 8G

USDI, BUR MINES, COLLEGE PK, MARYLAND

MEASUREMENT OF GROUND STRESS IN DEEP VERTICAL DRILLHOLES

L. OBERT, F. H. POTT

INT-BM-4144-9
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 670 1 FIELD 7C, 7D, 8D, 8G

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

IRON ORE MINERAL PROPERTIES

N. B. MELCHER, R. L. BLAKE
R. E. HESSEVICK, R. E. LUBKER
T. Z. ZOLTAI

INT-BM-4164-13
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INTERIOR-BUREAU OF MINES

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ZUG 680 1 FIELD 13B, 8D, 8G

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

RHEOLOGY OF CLAYS

G. C. PRICE

INT-BM-4363-11
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 682 1 FIELD 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

HYDRAULIC MINING - ENGINEERING FIELD TRIALS

S. ZIVKOVICH

INT-BM-4362-9
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 754 1 FIELD 8D, 8H, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

ACID MINE DRAINAGE - DRAINAGE CONTROL

S. KRICKOVIC, N. H. MOEBS

INT-BM-4362-5
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 764 1 FIELD 8D

USDI, BUR MINES, LARAMIE, WYOMING

PHENOMENA RELATED TO VARIATIONS IN

RESERVOIR OIL CHARACTERISTICS

C. Q. CUPPS, G. U. DINNEEN, J. FRY

INT-BM-1599A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 765 1 FIELD 8D, 8G

USDI, BUR MINES, LARAMIE, WYOMING

COMPARE WELL PERFORMANCE BASED ON FIELD TESTS AND LABORATORY DATA

O. C. BAPTIST, C. Q. CUPPS, G. U. DINNEEN
C. S. LAND, E. J. WHITE

INT-BM-1599-B
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 766 1 FIELD 8D

USDI, BUR MINES, LARAMIE, WYOMING

SUSCEPTIBILITY OF EAST U.S. OIL RESERVOIRS TO NEW RECOVERY METHODS

S. S. TAYLOR, J. R. DUDA, H. R. JOHNSON
W. K. OVERBEY, R. L. ROUGH
L. A. SCHRIDER

INT-BM-13-1613-4
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 767 1 FIELD 21D, 8D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

USE OF HEAT TO STIMULATE EASTERN U.S. PETROLEUM PRODUCTION

W. T. WERTMAN, E. L. BURWELL
G. G. CAMPBELL

INT-BM-13-1613-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 768 1 FIELD 8D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

INCREASING OIL RECOVERY IN APPALACHIAN AREA BY FLUID INJECTION

W. T. WERTMAN, J. PASINI, G. E. RENNICK

INT-BM-13-1613-2
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INTERIOR-BUREAU OF MINES

••••••••••

ZUG 769 1 FIELD 8N, 8K, 8D, 8G

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

ACOUSTIC, MAGNETIC, AND ELECTRIC ENERGY IN OIL PRODUCTION

W. T. WERTMAN, C. A. KOMAR, C. I. PIERCE

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INTERIOR-BUREAU OF MINES

09 ELECTRONICS AND ELECTRICAL ENGINEERING

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GH 1258 1 FIELD 9+

UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING- NEW YORK

A STUDY OF NON-LINEAR CONTROL SYSTEMS PROBLEMS

E. KINNEN

NASA-E-6-NSG-574
4/65- 3/66

NASA

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GPF 121 3 FIELD 9+,12A, 9D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, INST FOR COMPUTER RES, ILLINOIS

COMPUTER RESEARCH AND DEVELOPMENT

N. C. METROPOLIS, R. L. ASHENHURST
R. L. GRAVES, H. KANNER, R. H. MILLER
A. ORDEN, W. V. PETRYSHYN

AT(11-1)614
2/65- 1/66

AEC-DIVISION OF PHYSICAL RES

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GQA 203 1 FIELD 12A, 5C,15C,15G

JSACDCCSSG AUTOMATIC DATA PROCESSING SYSTEM SPECIFICATIONS STUDY

D. WALLACE

DA-19-020-AMC-00440
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DOD-ARMY

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GQA 226 1 FIELD 9+,12A

DIGITAL MACHINES AND AUTOMATA

F. C. HENNIE, F. +. HENNIE

DA-36-039-AMC-03200E
/65- /

DOD-ARMY

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GQA 310 1 FIELD 9+

NETWORK SYNTHESIS

H. B. LEE, H. +. LEE

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DOD-ARMY

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GQA 318 1 FIELD 9+

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MICHIGAN

STUDY OF TRANSFORM TECHNIQUES FOR TIME-VARYING DISCRETE-TIME LINEAR SYSTEMS

A. W. NAYLOR, K. B. IRANI

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DOD-ARMY

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GQA 448 2 FIELD 12A, 9D

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, PENNSYLVANIA

RESEARCH ON MECHANICAL LANGUAGES AND THEIR AUTOMATIC TRANSLATORS

S. GORN

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ACTIVE TIME-VARYING SYSTEMS AND LINEAR NETWORKS

H. J. CARLIN

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DOD-AIR FORCE

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CITY UNIV N Y NEW YORK, GRADUATE SCHOOL, NEW YORK

AUTOMATA THEORY AND FOUNDATIONS OF DICISION THEORY

R. C. JEFFREY

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GQF 3140 3 FIELD 9+, 9A,12A, 9C

IBM RESEARCH CENTER, NEW YORK

MATHEMATICAL STUDIES OF NON-LINEAR CIRCUITS

H. COHEN

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UNIVERSITY OF DELAWARE, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, DELAWARE

QUANTUM LIMITATIONS TO ELECTROMAGNETIC SIGNAL MEASUREMENTS

L. P. BOLGIANO

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GQF 3282 2 FIELD 9+,12A, 9C

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FUNCTIONAL NETWORK ANALYSIS AND SYNTHESIS

R. W. NEWCOMB

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GQF 3365 2 FIELD 9+,12A, 9D, 5C

UNIVERSITY OF ARIZONA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ARIZONA

PERFORMANCE DESIGN AND ORGANIZATION OF HYBRID COMPUTER SYSTEMS

G. A. KORN

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GQF 3384 2 FIELD 9+,12A, 9D, 5

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APPLICATION OF GRAPH THEORY TO NETWORKS

S. L. HAKIMI

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GQF 3394 2 FIELD 12A, 5C

RCA RES LAB, PRINCETON, NEW JERSEY

AUTOMATIC THEORY FORMATION AND RELATIVE COMPLEXITY OF PROGRAMS

S. AMAREL

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ADAPTIVE PREDICTIVE CONTROL SYSTEMS

P. M. DERUSSO

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GQF 3527 2 FIELD 9+,12A, 5C

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CONTROL SYSTEMS RESEARCH PROGRAM

P. E. SARACHICK

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GQF 3714 1 FIELD 9+,12A, 9C

ROCKFORD RES. INST.,, MASSACHUSETTS

THEORY OF METHODS FOR IMPLEMENTING INDUCTIVE INFERENCE

R. J. SOLOMONOFF

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GQF 3722 1 FIELD 9+,12A, 9C

UNIV OF ROCHESTER, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

SELF-ADAPTING AUTOMATA UNIVERSAL ELEMENTS AND A SPECIAL PURPOSE COMPUTER

J. F. RANDOLPH

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GQF 3755 1 FIELD 12A

SOCIETY FOR INDUSTRIAL, + APPLIED MATH, PHILA, PENNSYLVANIA

SIAM JOURNAL ON CONTROL

I. E. BLOCK

AF-AFOSR-0527-64
/65- /

DOD-AIR FORCE

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GQF 3821 FIELD 18,17G, 9+,12A

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

RESEARCH IN CONTROL SYSTEMS THEORY

C. T. LEONDES

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/65- /

DOD-AIR FORCE

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GQF 3918 FIELD 9C, 9+

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, CALIFORNIA

DETERMINATION OF OPTIMAL CONTROLS FOR SYSTEMS WITH DELAYS

I. FLUGGELOTZ

AF-49-638-01431
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DOD-AIR FORCE

••••••••••

GQF 3933 FIELD 9+,12A, 9D, 9C

STANFORD UNIVERSITY, GRADUATE SCHOOL, CALIFORNIA

THE STRUCTURE OF NETWORKS AUTOMATA AND CONTROL SYSTEMS

R. E. KALMAN

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DOD-AIR FORCE

••••••••••

GQF 3953 FIELD 9+,12A, 9C

INFORMATION PROCESSING BY EVOLUTIONARY AND MULTILEVEL NETWORKS

E. E. GOSE

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DOD-AIR FORCE

••••••••••

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APPLICATIONS OF CLASS K FUNCTIONS TO PASSIVE AND ACTIVE NETWORK SYNTHESIS

I. GEAST

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ANALYSIS OF ADAPTIVE LOGIC OPTIMIZATION

S. AUSLENDER

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ZUG 589 1 FIELD 9C, 9+

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

GENERATION, ACCUMULATION AND DISSIPATION OF STATIC ELECTRICITY

P. G. GUEST

INT-BM-3273-L
/66- /

INTERIOR-BUREAU OF MINES

10 ENERGY CONVERSION (NON-PROPULSIVE)

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ZUG 742 1 FIELD 20M,11B,11C,20C

USDI, BUR MINES, ALBANY, OREGON

THIN CERAMIC MEMBRANES FOR ELECTRIC ENERGY CELLS

H. J. KELLY, R. L. CARPENTER, J. I. PAIGE

INT-BM-4157-7
/66- /

INTERIOR-BUREAU OF MINES

11 MATERIALS

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GPF 713 1 FIELD 11F,11G,20L

MICHIGAN TECHNOL UNIV, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, MICHIGAN

EFFECT OF ANNEALING ON THE SUBSTRUCTURE OF COLD WORKED FCC METALS AND ALLOYS

D. E. MIKKOLA

AT(11-1)1431
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

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GPF 778 4 FIELD 20M,11F,11G,20F

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, METALLURGY, OHIO

KINETICS OF PHASE TRANSFORMATIONS IN ZIRCONIUM-NIOBIUM ALLOYS

R. F. HEHEMANN, D. F. GIBBONS
P. E. YAFFE

AT(11-1)-588
11/65-10/66

AEC-DIVISION OF PHYSICAL RES

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GQA 444 1 FIELD 11F,11G

LEHIGH UNIVERSITY, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, PENNSYLVANIA

FINE STRUCTURE PRODUCED BY CYCLIC MARTENSITIC TRANSFORMATION

G. KRAUSS

DA-31-124-ARO-D-237
/65- /

DOD-ARMY

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GQF 1132 5 FIELD 11G,11D

MASS INST OF TECHNOL, SCHOOL OF

ENGINEERING, METALLURGY, MASSACHUSETTS

MECHANICAL BEHAVIOR OF METAL COMPOSITES

J. WULFF

AF-49-638-01463
/65- /

DOD-AIR FORCE

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GQF 2419 4 FIELD 11F,13H,11G

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, MINERALS + METALS ENG, WISCONSIN

MECHANISM OF STRESS CORROSION CRACKING IN FACE-CENTERED CUBIC METALS

R. A. DUDO

AF-AFOSR-0221-63
/65- /

DOD-AIR FORCE

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GQF 2779 3 FIELD 5A,20F,20D,20L

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ENGIN PHYS + MAT SCI, NEW YORK

OXIDATION OF METAL SURFACES STUDIED BY ELECTRON DIFFRACTION AND MICROSCOPY

B. H. SIEGEL

AF-AFOSR-0770-65
/65- /

DOD-AIR FORCE

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GQF 3500 2 FIELD 11F,11G

RECRYSTALLIZATION AND GRAIN GROWTH IN MAGNESIUM AND CHROMIUM AND NICKEL

C. H. PITT

AF-AFOSR-0039-65
/65- /

DOD-AIR FORCE

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GQF 3538 1 FIELD 11B

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, ILLINOIS

PHASE TRANSFORMATION AND PRECIPITATION STUDIES IN CERAMICS

M. E. FINE, M. *. FINE

AF-AFOSR-0327-63
/65- /

DOD-AIR FORCE

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GQF 4345 FIELD 11F,11G

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, METALLURGY, OHIO

MECHANICAL PROPERTIES OF BODY-CENTERED CUBIC REFRACTORY METALS

T. E. MITCHELL

AF-AFOSR-0829-65
/65- /

DOD-AIR FORCE

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GQF 6665 1 FIELD 11F,11G

CARNEGIE INST TECHNOL, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, PENNSYLVANIA

DISLOCATION ARRAYS AND WORK HARDENING IN FACE CENTERED CUBIC METALS

W. H. ROBINSON

AF-AFOSR-0485-64
/65- /

DOD-AIR FORCE

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GSE 636 1 FIELD 20J,20L, 7B

ILLINOIS INST OF TECH, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, ILLINOIS

X-RAY SPECTRA OF TRANSITION-METAL ALLOYS

L. V. AZAROFF

NSF-GK-120
1/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 641 1 FIELD 11F,13H,11G

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, METALLURGY, MASSACHUSETTS

METASTABLE ALLOY SYSTEMS

N. J. GRANT

NSF-GK-115
1/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 678 FIELD 11F,11G,20L, 7B

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, METAL ENGIN + MAT SCI, FLORIDA

ELECTROTRANSPORT IN ALLOYS

A. G. GUY, R. E. HUMMEL

NSF-GK-602
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 680 FIELD 11B,11F,11G

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, MASSACHUSETTS

MECHANISMS OF STRAIN HARDENING

A. S. ARGON

NSF-GK-596
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 807 FIELD 5A,13H

AMER. INST. OF MININ, YORK, N.Y., NEW YORK

SECOND INTERNATIONAL POWDER METALLURGY CONFERENCE

K. H. ROLL

NSF-GK-377
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 819 FIELD 11G

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, PENNSYLVANIA

EFFECTS OF IRRADIATION ON PHASE-TRANSFORMATIONS

H. HERMAN

NSF-GK-444
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GYE 570044 1 FIELD 7C, 7D,11G,20J

BR COTTON IND RES INST, UNITED KINGDOM

CHEMICAL MODIFICATIONS OF COTTON FABRICS

J. G. ROBERTS

AGF-E29-UR-078
2/66- 1/67

AGRICULTURE-DEPT OF AGRICULTURE

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GYE 890150 1 FIELD 11G

CSIR MADRAS, INDIA

CHANGES OCCURRING IN RAPID TANNAGE OF HEAVY LEATHERS

S. K. BARAT

AGF-A07-UR-092
2/66- 1/67

AGRICULTURE-DEPT OF AGRICULTURE

****

JUC 1 1 FIELD 13B

JOHNS HOPKINS UNIV, SCHOOL OF ENGINEERING, SANITARY ENGINEERING, MARYLAND

METHODS FOR DETERMINING BIODEGRADABILITY OF DETERGENT MATERIALS

C. E. RENN, I. WINTNER

7/64-12/64

UNION CARBIDE OLEFINS COMPANY

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NIL 61 FIELD 20M,11G,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

ABLATION OF VISCOELASTIC BODIES

H. H. HILTON, R. L. HURWITZ

/65- /

ILLINOIS, UNIVERSITY OF

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SJ 20 FIELD 11F,13H,11G

UNIV OF MANITOBA, SCHOOL OF DENTISTRY, RESTORATIVE DENTISTRY, CANADA

METALLOGRAPHIC STUDIES OF SOLDERED JOINTS AND CAST GOLD PARENT METALS
I. KASLOFF

DA-107
7/65- 6/66

NATIONAL RESEARCH COUNCIL OF CANADA

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ZQA 1 1 FIELD 13H, 5A,11F,11G

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

DISTRIBUTION OF INOCULATING AGENTS IN NODULAR CAST IRON

P. GOETTSCH

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 17 FIELD 11G,11C,11H,11F

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

EVALUATION OF NEW CONCEPTS OF COMMERCIAL CORROSION PREVENTIVES

F. NOVEKOFF

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

•••••••••

ZQA 32 FIELD 5A,11G,11F,12A

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

PROPERTIES OF METALS AS RELATED TO DEFORMATION-PRODUCED DEFECTS

L. MEISEL

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 35 FIELD 11F,13H,11G

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

NOTCH SENSITIVITY OF HIGH STRENGTH STEELS UNDER HIGH CYCLIC PRESSURE

J. UY, T. DAVIDSON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 38 FIELD 11B,11G,11D,11F

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

WHISKER COMPOSITES

I. AHMAD

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

•••••••••

ZQA 182 FIELD 11C,11F

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

HEAT RESISTANT PHOSPHATE COATINGS

L. WAGNER

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 183 FIELD 11G

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

TEST AND EVALUATION OF NEW ELASTOMERS AND COMPOUNDING INGREDIENTS

F. TESTROET

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 202 FIELD 11C,11F,13H,11G

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

REDUCTION OF STRESS CORROSION BY SACRIFICIAL COATINGS

R. WOLFF

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 219 FIELD 11G,11H

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

PHASE CHANGES IN GREASE

R. L. YOUNG

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 225 FIELD 11G,11C,11H

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

INVESTIGATION OF VEHICLE CORROSION PREVENTIVE

H. MUFFLEY

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZUG 136 2 FIELD 11F,13H

USDI, BUR MINES, ALBANY, OREGON

FLOTATION RESEARCH ON MINERALS OF RARE METALS

W. A. STICKNEY, A. J. FERGUS
G. V. SULLIVAN

INT-BM-4156-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 137 2 FIELD 7D, 7B

USDI, BUR MINES, ALBANY, OREGON

PHOSPHATE ROCK FLOTATION

W. A. STICKNEY, C. W. CLARK
W. G. GRUZENSKY, J. W. TOWN

INT-BM-4156-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 138 2 FIELD 11F,13H

USDI, BUR MINES, ALBANY, OREGON

EXTRACTION OF ALUMINA FROM FERRUGINOUS BAUXITE

L. H. BANNING, A. D. FUGATE
O. C. FURSMAN

INT-BM-4156-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 140 2 FIELD 11F,13H,11G

USDI, BUR MINES, ALBANY, OREGON

PREPARING HIGH-PURITY BERYLLIUM

F. E. BLOCK, T. T. CAMPBELL
R. E. MUSSLER

INT-BM-4156-5
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 144 2 FIELD 11F,13H

USDI, BUR MINES, ALBANY, OREGON

ELECTRIC SMELTING LEAD-ZINC CONCENTRATES

L. H. BANNING, J. E. MAUSER
S. C. SCHAEFER, R. N. SPENCER

INT-BM-4156-8
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 146 2 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, ALBANY, OREGON

RECOVERY OF REFRACTORY METALS BY HALOGENATION PROCESSES

F. E. BLOCK, A. W. HENDERSON
W. S. THOMAS, D. H. YEE

INT-BM-4156-10
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 158 2 FIELD 7D, 7A, 7B

USDI, BUR MINES, ALBANY, OREGON

ANALYTICAL RESEARCH - GASES IN METALS USING GAS CHROMATOGRAPHY

D. M. MORTIMORE, D. H. BOLLMAN

INT-BM-4156-16A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 168 2 FIELD 20M,11F,13H,11G

USDI, BUR MINES, ALBANY, OREGON

TUNGSTEN ALLOYS

W. L. OBRIEN, H. KATO, C. J. SANDWITH

INT-BM-4157-5
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 170 2 FIELD 7A, 7D,11B,11D

USDI, BUR MINES, ALBANY, OREGON

METAL-NONMETAL MATERIALS FOR HIGH-TEMPERATURE AND HIGH-STRENGTH APPLICATIONS

T. T. CAMPBELL, F. E. BLOCK
G. B. ROBIDART, J. L. SCHALLER

INT-BM-4157-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 174 2 FIELD 11F,13H, 7B

USDI, BUR MINES, BOULDER CITY, NEVADA

ALUMINA PROCESSING

H. G. IVERSON, T. R. GRAHAM

INT-BM-4158-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 175 2 FIELD 11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

RARE-EARTH METAL EXTRACTION

R. E. LINDSTROM, T. R. GRAHAM

INT-BM-4158-4
/66- /

INTERIOR-BURFAU OF MINES

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ZUG 177 2 FIELD 7A, 7D,20M,11F

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROREFINING OF MOLTEN ALLOYS

T. A. HENRIE, T. R. GRAHAM

INT-BM-4158-5
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 180 2 FIELD 11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

TITANIUM ELECTROCHEMISTRY

D. E. COUCH, H. KNUDSEN, O. Q. LEONE

INT-BM-4158-7
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 181 2 FIELD 7A, 7D,20M, 8G

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROWINNING REFRACTORY METALS - M
OLYBDENUM AND TUNGSTEN

D. H. BAKER, T. R. GRAHAM

INT-BM-4158-9
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 184 2 FIELD 7D,20M, 8D,11F

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROWINNING AND METALLURGICAL
EVALUATION OF RARE-EARTH METALS AND
ALLOYS

T. A. HENRIE, T. R. GRAHAM

INT-BM-4158-10
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 187 2 FIELD 7D,11C,11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROWINNING OF THORIUM

T. A. HENRIE, T. R. GRAHAM

INT-BM-4158-13
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 188 2 FIELD 7A, 7D,11F,11G

USDI, BUR MINES, BOULDER CITY, NEVADA

INTERACTIONS BETWEEN REACTIVE METALS AND
MOLTEN HALIDE SYSTEMS

T. A. HENRIE, T. R. GRAHAM

INT-BM-4158-16
/66-

INTERIOR-BUREAU OF MINES

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ZUG 197 2 FIELD 11F,13H,11G

USDI, BUR MINES, BOULDER CITY, NEVADA

PHYSICAL METALLURGY OF TUNGSTEN,
VANADIUM, AND MOLYBDENUM

H. G. IVERSON, T. R. GRAHAM

INT-BM-4159-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 206 2 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, S.L.C., UTAH

PHOSPHORUS AND VANADIUM FROM
FERROPHOSPHORUS

B. H. CLEMMONS, L. C. BAUERLE
C. J. CHINDGREN, B. K. SHIBLER

INT-BM-4160-6
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 208 2 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, S.L.C., UTAH

RECOVERY OF RIBIDIUM AND CESIUM

B. H. CLEMMONS, B. *. CLEMMONS
K. C. DEAN, I. L. NICHOLS, D. L. ROCKHOLT

INT-BM-4160-7
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 209 2 FIELD 7D, 8D, 8H,11F

USDI, BUR MINES, S.L.C., UTAH

RECOVERY OF METALS FROM SALINE WATER

B. H. CLEMMONS, B. *. CLEMMONS
D. R. GEORGE, J. M. RILEY
D. M. YERGENSEN

INT-BM-4160-8
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 215 2 FIELD 5A,11F,13H,13I

USDI, BUR MINES, S.L.C., UTAH

MAGNESIUM PROCESS DEVELOPMENT AND
EVALUATION

B. H. CLEMMONS, B. *. CLEMMONS
K. C. DEAN, V. E. EDLUND, D. A. ELKINS
P. L. PLACER, J. W. STERNER

INT-BM-4160-12
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 220 2 FIELD 7D,13H, 7B

USDI, BUR MINES, ROLLA, MISSOURI

SPECTROPHOTOMETRIC ANALYSIS OF FLOTATION
PROCESSES

M. KENWORTHY, R. E. COLEMAN, H. E. POWELL

INT-BM-4162-B
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 226 2 FIELD 7C, 7A, 7D,20J

USDI, BUR MINES, ROLLA, MISSOURI

CATALYSIS OF METALLURGICAL REACTIONS

A. A. COCHRAN, W. L. FALKE
J. B. STEPHENSON

INT-BM-4162-F
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 229 2 FIELD 11C,11F,11G

USDI, BUR MINES, ROLLA, MISSOURI

VAPOR DEPOSITION

M. KENWORTHY, J. G. DONALDSON
F. W. HOERTEL

INT-BM-4163-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 232 2 FIELD 11F,13H,11G, 5A

USDI, BUR MINES, ROLLA, MISSOURI

SOLDERING ALLOYS

J. W. JENSEN, R. T. DEWOODY, V. R. MILLER
A. E. SCHWANEKE

INT-BM-4163-D
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 239 2 FIELD 11F,13H,11G, 5A

USDI, BUR MINES, ROLLA, MISSOURI

VIBRATION DAMPING ALLOYS

J. W. JENSEN, R. R. MOTHOURFT
R. L. REYNOLDS, A. E. SCHWANEKE

INT-BM-4163-J
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 240 2 FIELD 7C, 7D,11F,13H

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

IRON ORE BENEFICIATION - FLOTATION
RESEARCH

N. B. MELCHER, A. F. COLOMBO
C. B. DAELLENBACH, D. W. FROMMER
A. R. RULE, R. T. SORENSEN

INT-BM-4164-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 245 2 FIELD 8D,11F,13H

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

IRON ORE GRINDING - MAGNETIC REDUCTION

N. B. MELCHER, D. W. FROMMER
P. A. WASSON

INT-BM-4164-2
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 251 2 FIELD 7C, 7D, 8D, 8G

USDI, BUR MINES, TUSCALOOSA, ALABAMA

BENEFICIATION OF FLUORSPAR-BARITE ORES

W. H. EDDY, J. S. BROWNING

INT-BM-4166-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 256 2 FIELD 11G,13H

USDI, BUR MINES, TUSCALOOSA, ALABAMA

SEPARATION OF MINERALS BY HEAVY LIQUIDS

R. B. TIPPIN, J. S. BROWNING

INT-BM-4166-4
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 257 2 FIELD 11F,13H

USDI, BUR MINES, TUSCALOOSA, ALABAMA

IRON ORE REDUCTION

E. G. DAVIS, J. E. BERRYHILL
F. E. BRANTLEY, J. O. CRABTREE

INT-BM-4166-7
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 265 1 FIELD 7C, 7D, 8D, 8G

USDI, BUR MINES, NORRIS, TENNESSEE

SYNTHETIC MICA

F. D. LAMB, N. A. PACE, H. R. SHELL

INT-BM-111421-17
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 265 2 FIELD 7C, 7D, 8D, 8G

USDI, BUR MINES, NORRIS, TENNESSEE

SYNTHETIC MICA

F. D. LAMB, N. A. PACE, H. R. SHELL

INT-BM-111421-17
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 266 1 FIELD 7B, 7D,11B,20J

USDI, BUR MINES, NORRIS, TENNESSEE

SYNTHETIC ASBESTOS

F. D. LAMB, N. A. PACE, H. R. SHELL

INT-BM-111421-18
/65- /

INTERIOR-BUREAU OF MINES

****

ZUG 266 2 FIELD 7B, 7D,11B,20J

USDI, BUR MINES, NORRIS, TENNESSEE

SYNTHETIC ASBESTOS

F. D. LAMB, N. A. PACE, H. R. SHELL

INT-BM-111421-18
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 267 1 FIELD 11F,11G

USDI, BUR MINES, NORRIS, TENNESSEE

REFRACTORY AND HARD MATERIALS

F. D. LAMB, N. A. PACE, M. E. TYRRELL

INT-BM-111421-16
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 267 2 FIELD 11F,11G

USDI, BUR MINES, NORRIS, TENNESSEE

REFRACTORY AND HARD MATERIALS

F. D. LAMB, N. A. PACE, M. E. TYRRELL

INT-BM-111421-16
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 271 2 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

ELECTROSTATIC AND MAGNETIC SEPARATION

F. D. LAMB, F. FRAAS, M. J. SPENDLOVE

INT-BM-111421-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 272 1 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

USE OF INTERMETALLIC COMPOUNDS IN BASE METAL REFINING

F. D. LAMB, H. S. CALDWELL, J. A. RUPPERT
P. M. SULLIVAN

INT-BM-111421-21
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 272 2 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

USE OF INTERMETALLIC COMPOUNDS IN BASE METAL REFINING

F. D. LAMB, H. S. CALDWELL, J. A. RUPPERT
P. M. SULLIVAN

INT-BM-111421-21
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 273 2 FIELD 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

RECOVERY OF NICKEL AND CADMIUM FROM BATTERY SCRAP

F. D. LAMB, H. S. CALDWELL
P. M. SULLIVAN, D. A. WILSON

INT-BM-111421-9
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 275 1 FIELD 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

CARRIER-GAS DISTILLATION OF VOLATILE METALS

F. D. LAMB, H. S. CALDWELL
P. M. SULLIVAN

INT-BM-111421-22
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 275 2 FIELD 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

CARRIER-GAS DISTILLATION OF VOLATILE METALS

F. D. LAMB, H. S. CALDWELL
P. M. SULLIVAN

INT-BM-111421-22
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 276 1 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

FLUX REFINING NONFERROUS METALS

F. D. LAMB, J. A. RUPPERT, P. M. SULLIVAN

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INTERIOR-BUREAU OF MINES

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ZUG 276 2 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

FLUX REFINING NONFERROUS METALS

F. D. LAMB, J. A. RUPPERT, P. M. SULLIVAN

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INTERIOR-BUREAU OF MINES

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ZUG 277 2 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

SEPARATION OF METALS BY CEMENTATION

F. D. LAMB, C. B. KENAHAN, D. SCHLAIN

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INTERIOR-BUREAU OF MINES

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ZUG 280 2 FIELD 7A, 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

ELECTROLYTIC REDUCTION OF ALUMINA

F. D. LAMB, C. B. KENAHAN, D. SCHLAIN

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INTERIOR-BUREAU OF MINES

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ZUG 281 2 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

PRODUCTION OF HIGH-PURITY BASE METALS BY AMALGAM ELECTROLYSIS

F. D. LAMB, D. H. CHAMBERS
P. M. SULLIVAN

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INTERIOR-BUREAU OF MINES

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ZUG 283 2 FIELD 8D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

METALLURGICAL PROCESS EVALUATION

F. D. LAMB, R. C. KIRBY, M. J. SPENDLOVE

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INTERIOR-BUREAU OF MINES

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ZUG 286 2 FIELD 7D, 7A,20M,11F

USDI, BUR MINES, COLLEGE PK, MARYLAND

OXIDATION RATES OF MOLTEN BASE METALS AND ALLOYS

F. D. LAMB, P. M. SULLIVAN, D. A. WILSON

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INTERIOR-BUREAU OF MINES

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ZUG 287 2 FIELD 7D,20J, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

CHEMICAL INSTRUMENTAL ANALYSIS OF HIGH-PURITY METALS

F. D. LAMB, W. J. CAMPBELL, T. E. GREEN
J. W. THATCHER

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INTERIOR-BUREAU OF MINES

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ZUG 331 2 FIELD 7C,21D, 7D,11A

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

LOW-TEMPERATURE TAR RESEARCH

H. W. WAINWRIGHT, J. S. BERBER
J. R. COMERIATTI, P. A. ESTEP, C. KARR
J. J. KOVACH, L. R. LITTLE

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INTERIOR-BUREAU OF MINES

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ZUG 548 1 FIELD 11F,13H

USDI, BUR MINES, S.L.C., UTAH

CHEMICAL METALLURGY PROCESSING OF BASE METAL ORES

B. H. CLEMMONS, P. E. CHURCHWARD
D. R. GEORGE, K. E. TAME

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INTERIOR-BUREAU OF MINES

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ZUG 550 1 FIELD 11F,13H

USDI, BUR MINES, S.L.C., UTAH

PURIFICATION OF NICKEL ANDCOBALT

B. H. CLEMMONS, P. T. BROOKS, L. CROCKER
K. C. DEAN, E. G. VALDEZ

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INTERIOR-BUREAU OF MINES

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ZUG 552 1 FIELD 7D, 7C,13H

USDI, BUR MINES, S.L.C., UTAH

RADIOACTIVE CHEMISTRY IN EXTRACTIVE METALLURGY

B. H. CLEMMONS, H. L. GIBBS, A. M. POSTON
C. H. SCHACK

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INTERIOR-BUREAU OF MINES

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ZUG 554 1 FIELD 8G,11F,13H, 7B

USDI, BUR MINES, S.L.C., UTAH

EXTRACTIVE METALLURGY OF BERYLLIUM

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R. HAVENS, J. M. MAURICE, G. M. POTTER
G. S. SMYRES

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INTERIOR-BUREAU OF MINES

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ZUG 556 1 FIELD 11F,13H,11G

USDI, BUR MINES, ROLLA, MISSOURI

COBALT HARDENING OF STAINLESS STEELS

D. H. DESY, P. G. BARNARD, L. C. FINCHER
M. M. TILMAN

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INTERIOR-BUREAU OF MINES

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ZUG 557 1 FIELD 20M,11F,13H,11G

USDI, BUR MINES, ROLLA, MISSOURI

PROPERTIES OF TUNGSTEN ALLOYS

D. H. DESY, P. G. BARNARD, R. L. CROSBY
J. L. HOLMAN, W. L. JONES, C. C. MYERS
L. A. NEUMEIER

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INTERIOR-BUREAU OF MINES

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ZUG 558 1 FIELD 11F,13H,11G

USDI, BUR MINES, ROLLA, MISSOURI

PREPARATION OF HIGH-STRENGTH STEELS

D. H. DESY, P. G. BARNARD, L. W. HIGLEY
P. W. MARTIN, J. A. ROWLAND, D. F. WALSH

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INTERIOR-BUREAU OF MINES

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ZUG 560 1 FIELD 11F,13H,11G

USDI, BUR MINES, ROLLA, MISSOURI

PREPARATION OF IMPROVED ZINC-BASE ALLOYS

D. H. DESY, R. L. CROSBY, J. T. DUNHAM
J. L. HOLMAN, R. A. KELLY, J. S. RISBECK
J. A. ROWLAND

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INTERIOR-BUREAU OF MINES

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ZUG 610 1 FIELD 7D, 7A,11F, 5A

USDI, BUR MINES, ROLLA, MISSOURI

HIGH TEMPERATURE CORROSION OF ALLOYS

J. W. JENSEN, J. L. BRYAN, R. M. DOERR

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INTERIOR-BUREAU OF MINES

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ZUG 662 1 FIELD 11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

RECOVERY OF NICKEL AND COBALT

T. A. SULLIVAN, B. E. BARTON

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INTERIOR-BUREAU OF MINES

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ZUG 664 1 FIELD 7A, 7D,11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROMETALLURGY OF VANADIUM

T. A. SULLIVAN, F. R. CATTOIRE, K. P. LEI

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INTERIOR-BUREAU OF MINES

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ZUG 665 1 FIELD 7A, 7D,11F, 7B

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROMETALLURGY OF COLUMBIUM

M. M. WONG, D. E. KIRBY

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INTERIOR-BUREAU OF MINES

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ZUG 666 1 FIELD 11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROMETALLURGY OF BERYLLIUM

M. M. WONG, D. A. OKEEFE

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INTERIOR-BUREAU OF MINES

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ZUG 667 1 FIELD 7A, 7D,11F,13H

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROMETALLURGY OF HAFNIUM

M. M. WONG, G. M. MARTINEZ

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INTERIOR-BUREAU OF MINES

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ZUG 668 1 FIELD 7C, 7A, 7D,11F

USDI, BUR MINES, BOULDER CITY, NEVADA

ELECTROMETALLURGY OF YTTRIUM

M. M. WONG, C. C. MERRILL

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INTERIOR-BUREAU OF MINES

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ZUG 672 1 FIELD 11F,13H

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

MAGNETIC SEPARATION-ACID LEACHING TREATMENT OF MANGANIFEROUS ORES

N. B. MELCHER, M. M. FINE, H. D. JACOBS

P. L. WESTON

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INTERIOR-BUREAU OF MINES

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ZUG 679 1 FIELD 7D,11G,11F,13H

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

SULFATIZATION-MAGNETIC REDUCTION

N. B. MELCHER, F. E. JOYCE, W. V. KUSTER
D. E. NASS, R. E. PETERSON, C. PRASKY
D. L. SIEBERT

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INTERIOR-BUREAU OF MINES

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ZUG 740 1 FIELD 11B,11D,11G

USDI, BUR MINES, ALBANY, OREGON

HIGH TEMPERATURE ROLL FORMING OF CERAMIC SHAPES

H. J. KELLY, H. M. HARRIS, P. H. SUNSET

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INTERIOR-BUREAU OF MINES

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ZUG 752 1 FIELD 20M,11B,11F,13H

USDI, BUR MINES, ALBANY, OREGON

SYSTEMS FOR UNITING REFRACTORY MATERIALS

H. J. KELLY, J. E. KELLEY, D. H. SUMMER

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INTERIOR-BUREAU OF MINES

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ZUG 756 1 FIELD 11B, 7B

USDI, BUR MINES, ALBANY, OREGON

HIGH MELTING POINT CARBIDES (HAFNIUM CARBIDE)

H. KATO, R. P. ADAMS, R. A. BEALL
M. I. COPELAND

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INTERIOR-BUREAU OF MINES

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ZUG 771 1 FIELD 7C, 7D,21D,11L

USDI, BUR MINES, LARAMIE, WYOMING

COMPOSITION AND UTILIZATION OF PETROLEUM ASPHALTS

J. C. PETERSEN, T. C. DAVIS
G. U. DINNEEN, D. B. ECCLESTON
W. E. HAINES, R. V. HELM

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12 MATHEMATICAL SCIENCES

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GH 1217 1 FIELD 12A, 9D

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DEVELOPMENT AND ANALYZING BASIC SCIENTIFIC RESEARCH ENTITLED - STOCHASTIC MODELS FOR MULTIDIMENSIONAL MULTI-VALUED RELATIONS

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ASYMPTOTIC SOLUTIONS OF ORDINARY LINEAR DIFFERENTIAL EQUATIONS

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THE MANY BODY PROBLEM

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MULTIVARIATE THEORY

I. OLKIN

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CLUSTERING OF POINTS IN LINE AND PLANE

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ALGEBRAIC GROUPS AND AVELIAN VARIETIES

W. L. BAILY, I. SATAKE

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COMBINATERIAL METHODS IN STATISTICAL MECHANICS

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ALGEBRA AND ALGEBRAIC GEOMETRY

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NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS OF MIXED TYPE

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NON-LINEAR WAVE PROBLEMS

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GSP 2367 FIELD 12A

UNIV OF WISCONSIN, GRADUATE SCHOOL, MATHEMATICS, WISCONSIN

PROBABILITY AND FUNCTIONAL ANALYSIS

A. BECK, H. E. CONNER

NSF-GP-4588
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2377 FIELD 12A

UNIV OF TENNESSEE, GRADUATE SCHOOL, MATHEMATICS, TENNESSEE

MATRIX REPRESENTATIONS OF TOPOLOGICAL SEMIGROUPS

D. R. BROWN

NSF-GP-4617
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2380 FIELD 12A

UNIV OF WASHINGTON, GRADUATE SCHOOL, MATHEMATICS, WASHINGTON

HARDY SPACES AND POTENTIAL THEORY

M. G. ARSOVE, L. LUMER

NSF-GP-4653
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2381 FIELD 12A

ILLINOIS INST OF TECH, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

FOURIER SERIES AND FOURIER-STIELTJES-SINE SERIES

G. W. GOES

NSF-GP-4660
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2382 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, STATISTICS, CALIFORNIA

FIFTH BERKELEY SYMPOSIUM ON MATHEMATICAL STATISTICS

L. M. LECAM, J. NEYMAN

NSF-GP-4438
4/65- 4/6[illegible]

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2408 FIELD 12A

SEMI-NORMED ALGEBRAS AND TOPOLOGICAL SPACES

C. WENJEN

NSF-GP-4169
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2409 FIELD 12A

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, MATHEMATICS, PENNSYLVANIA

UNIVERSAL ALGEBRAS AND RELATED STRUCTURES

G. GRATZER

NSF-GP-4221
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2410 FIELD 12A

RUTGERS THE STATE UNIV, GRADUATE SCHOO MATHEMATICS, NEW JERSEY

INJECTIVE DIMENSION OF MODULES

B. L. OSOFSKY

NSF-GP-4226
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2411 FIELD 12A

UNIV OF CAL-SANTA BARB, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

COMPOUND MATRIX EQUATIONS AND FUNCTIONALLY COMPLETE ALGEBRAS IN THE

SMALL

A. YAQUB

NSF-GP-4163
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2416 1 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

GEOMETRY, TOPOLOGY AND GROUP THEORY

S. S. CHERN, G. BREDON, R. BROWN, I. FARY P. FONG, G. HOCHSCHILD, A. OGG

NSF-GP-3990
1/66- 1/67

NSF-PHYSICAL SCIENCES DIVISION

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GSS 215 1 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, CALIFORNIA

THEORY OF INDUCTIVE PROBABILITY

R. CARNAP

NSF-GS-550
1/66- 1/67

NSF-SOCIAL SCIENCES DIVISION

****

NG 50 FIELD 12A

PURDUE UNIVERSITY, GRADUATE SCHOOL, MATHEMATICAL SCIENCES, INDIANA

ANALYSIS IN THE LARGE

A. ADLER

K
7/64- 6/65

PURDUE UNIVERSITY

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

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7GX 1339 2 FIELD 13B, 7C, 7D, 7A

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MICHIGAN

ADSORPTION FROM AQUEOUS SOLUTION

W. J. WEBER, R. D. KOCHHAR

7-WP-00706-02
1/66-12/66

PHS-BSS

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7GX 2035 2 FIELD 13B

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

UCB-ENG-2314--TRANSIENT LOADING EFFECTS IN THE ACTIVATED SLUDGE PROCESS

D. JENKINS, D. W. DOHHOFF

7-WP-00787-02
12/65-11/66

PHS-BSS

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GJA 105 1 FIELD 19+,18A

USN, BUR SHIPS, SAN FRANCISCO, CALIFORNIA

RADIATION SHIELDING EFFECTIVENESS OF COMPARTMENTED STRUCTURES

B. W. SHUMWAY

3CO-PS-64-92
/65- /

DOD-ARMY

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GJA 334 2 FIELD 20D,10B

FRANKLIN INSTITUTE, PENNSYLVANIA

A STABILITY ANALYSIS OF TILTING PAD BEARINGS

D. D. FULLER

DA-31-124-ARO-D-147
/65- /

DOD-ARMY

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GJF 349 8 FIELD 13M,12A, 5A

AMER. SOC. OF MECH., NEW YORK

APPLIED MECHANICS REVIEWS

S. JUHASZ

AF-49-638-01549
/65- /

DOD-AIR FORCE

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GJF 4502 FIELD 5A

FIFTH U.S. NATIONAL CONGRESS OF APPLIED MECHANICS

E. SILBERMAN

NIPR-0005-65
/65- /

DOD-AIR FORCE

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ZUG 567 1 FIELD 13H

USDI, BUR MINES, TUSCALOOSA, ALABAMA

MICROGRINDING RESEARCH

F. J. CSERVENYAK, I. L. FELD
M. H. STANCZYK

INT-BM-4166-6
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 593 1 FIELD 11C,11F,13H

USDI, BUR MINES, ALBANY, OREGON

MELTING AND CASTING OF REFRACTORY AND REACTIVE METALS

A. H. ROBERSON, W. E. ANABLE
S. L. AUSMUS, R. A. BEALL, E. D. CALVERT
M. D. CARVER, P. G. CLITES

INT-BM-4157-1
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 696 1 FIELD 21B, 7D,20M,10B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

INVESTIGATION OF FURNACE PERFORMANCE FACTORS

W. H. OPPELT, R. R. GADOMSKI
A. A. ORNING, C. H. SCHWARTZ

INT-BM-4185-24
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 721 1 FIELD 19D,21B,21D, 7D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

HYDROGEN SAFETY--HYDROGEN LEAKS AND FLAMES

R. A. VANMETER, J. GRUMER, S. R. HARRIS I. LIEBMAN

INT-BM-4323-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 722 1 FIELD 19D,21I, 7A, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

HYDROGEN SAFETY--CONTINUING SURVEY AND MANUAL PREPARATION

R. A. VANMETER, J. GRUMER

INT-BM-4323-B
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 728 1 FIELD 19D, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

INVESTIGATIONS OF DISASTERS CAUSED BY EXPLOSIVES

R. W. VANDOLAH, F. C. GIBSON, J. GRUMER
N. E. HANNA, E. L. LITCHFIELD
C. M. MASON

INT-BM-3273-R
/66- /

INTERIOR-BUREAU OF MINES

14 METHODS AND EQUIPMENT

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ZUG 613 1 FIELD 19D,21D, 7A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

TESTS PERFORMED UNDER FEDERAL CODE OF REGULATIONS

N. E. HANNA, P. A. RICHARDSON

INT-BM-3273-D
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 727 1 FIELD 19D, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

CONSULTATION WITH OTHER GOVERNMENT AND NONPROFIT ORGANIZATIONS

R. W. VANDOLAH, F. C. GIBSON, J. GRUMER
N. E. HANNA, E. L. LITCHFIELD
C. M. MASON

INT-BM-3273-Q
/66- /

INTERIOR-BUREAU OF MINES

15 MILITARY SCIENCES

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GQA 161 FIELD 12A,15C,19+,19H

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

EVALUATION OF NUCLEAR WEAPON THERMAL THREAT

F. I. JOHN

OCD-PS-64-201
/65- /

DOD-ARMY

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GQA 174 FIELD 15G

THE OPTIMUM MAINTENANCE SERVICE SUPPORT TOMSS

J. KEMPER, W. BASS

DA-19-020-AMC-00440
/65- /

DOD-ARMY

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GQA 183 FIELD 12A, 5C,15C,15G

AMMUNITION SERVICE TO THE FIELD 1965-1970 SUBSTUDY ON THROUGHPUT

J. KEMPER, F. DAVID

DA-19-020-AMC-00440
/65- /

DOD-ARMY

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GQA 198 FIELD 15G

THEATER POL REQUIREMENTS

J. KEMPER, R. GREEN

DA-19-020-AMC-00440
/65- /

DOD-ARMY

••••••••••

GQA 201 2 FIELD 12A, 5C,15C,15G

COMPUTER-ASSISTED SIMULATION OF SUPPLY + RELATED SYSTEMS CASSARS

D. WALLACE, D. SAUNDERS

DA-19-020-AMC-00440
/65- /

DOD-ARMY

••••••••••

GQA 202 1 FIELD 12A,15C,15G

DEVELOPMENT OF COMPUTER PROGRAMS TO ASSIST IN PRODUCTIONS REVISION CHANGE PROCESSING OF TOES SECTIONS 2 + 3

D. WALLACE, C. ROWE

DA-19-020-AMC-00440
/65- /

DOD-ARMY

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GQA 205 FIELD 15G

SHELTER REQUIREMENTS FOR THE ARMY IN THE FIELD - 1966-1980

J. KEMPER, W. BASS

DA-19-020-AMC-00440
/65- /

DOD-ARMY

17 NAVIGATION, COMMUNICATIONS DETECTION AND COUNTERMEASURES

••••••••••

GH 1483 4 FIELD 9+

US, SMITHSONIAN INST, DIST OF COLUMBIA

OPTICAL SATELLITE TRACKING PROGRAM

F. L. WHIPPLE

NSG-87
7/64- 9/65

NASA

••••••••••

GQF 3834 FIELD 9+,12A

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

COMMUNICATION SYSTEMS THEORY

A. V. BALAKRISHNAN

AF-AFOSR-0700-65
/65- /

DOD-AIR FORCE

••••••••••

GQF 4435 FIELD 9+,12A, 9D, 9C

UNIV OF SOUTHERN CALIF, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

AUTOMATA AND COMMUNICATIONS

S. W. GOLOMB

AF-AFOSR-0874-65
/65- /

DOD-AIR FORCE

••••••••••

GQF 4438 FIELD 9+

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

COMMUNICATION VIA TIME-VARIANT CHANNELS

T. KAILATH

AF-49-638-01517
/65- /

DOD-AIR FORCE

18 NUCLEAR SCIENCE AND TECHNOLOGY

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GH 1379 1 FIELD 18A

US, AEC, ORNL, ONAL LAB, TENNESSEE

CONDUCT INVESTIGATIONS IN HIGH ENERGY RADIATION DOSIMETRY

A. HOLLAENDER

R-104-(03)
1/65-12/65

NASA

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GPE 24 4 1 FIELD 19D, 7D,12A, 8E

USN, BUR SHIPS, SAN FRANCISCO, CALIFORNIA

THE FORMATION, DISTRIBUTION AND CHARACTERISTICS OF RADIOACTIVE FALLOUT - PREDICTION OF RADIOLOGICAL PROPERTIES

G. R. CROCKER, M. A. CONNORS, T. TURNER

AT-49-7-1963
7/64- 6/65

AEC-BIOLOGY + MEDICINE

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GPE 316 3 FIELD 7D, 7C, 7A,18A

TRACER LAB., INC., MASSACHUSETTS

PHYSICAL, CHEMICAL AND RADIOCHEMICAL ANALYSIS OF FILTER DEBRIS

L. LEVANTHAL

AT-04-3-453
11/64-12/65

AEC-BIOLOGY + MEDICINE

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GPE 863 3 FIELD 18A, 7B

STANFORD UNIVERSITY, SCHOOL OF MEDICINE, RADIOLOGY, CALIFORNIA

ENERGY DISSIPATION BY BETA-PARTICLE SOURCES

R. LOEVINGER, J. GEISSELSODER

AT-04-3-326-04
10/64- 9/65

AEC-BIOLOGY + MEDICINE

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GQA 549 FIELD 5A,15C,18A

UPDATING OF SM 1 SAFEGUARDS REPORT

M. P. ARROWSMITH

DA-44-009-AMC-547
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DOD-ARMY

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GQF 363 12 FIELD 18A, 7D, 7B

MCMASTER UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CANADA

NUCLEAR STABILITY AND NUCLEAR ENERGETICS BY MEANS OF ATOMIC MASS MEASUREMENT

H. E. DUCKWORTH

AF-AFOSR-0159-64
/65- /

DOD-AIR FORCE

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GQF 4332 FIELD 9+, 9A, 5A,18A

STANFORD UNIVERSITY, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

X-RAY DETECTION WITH SCINTILLATORS AND SEMICONDUCTORS

R. HOFSTADTER

AF-49-638-01499
/65- /

DOD-AIR FORCE

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GQF 4449 FIELD 12A,20H, 5A, 7D

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, PHYSICS, TEXAS

THEORETICAL STUDIES IN NUCLEAR PHYSICS

J. L. GAMMEL

AF-AFOSR-0918-65
/65- /

DOD-AIR FORCE

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ZUG 741 1 FIELD 7C,21D, 7D,20M

USDI, BUR MINES, ALBANY, OREGON

INVESTIGATION OF THE SYSTEM URANIUM CARBIDE-URANIUM NITRIDE-URANIUM OXIDE

H. J. KELLY, R. BLICKENSDERFER
J. L. HENRY, D. L. PAULSON

INT-BM-4157
/66- /

INTERIOR-BUREAU OF MINES

19 ORDNANCE

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DA 191 1 FIELD 15C,19+,15G

GENERAL ELECTRIC CO, BURLINGTON, VERMONT

DESIGN DEVELOP TEST AND EVALUATE FORWARD AIR DEFENSE GUN SYSTEM

G. SCHIAVONE

DA-19-020-AMC-00349W
/65- /

DOD-ARMY

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ZUG 584 1 FIELD 19D,21D, 7A, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SYMPATHETIC DETONATION BY AN AND AN-FO BLASTING AGENTS

F. C. GIBSON, J. N. MURPHY
R. W. VANDOLAH

INT-BM-4393
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 585 1 FIELD 19D,21B,21D,21I

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SENSITIVITY OF PROPELLANT SYSTEMS

F. C. GIBSON, J. E. HAY, J. RIBOVICH
F. H. SCOTT, C. R. SUMMERS, R. W. WATSON

INT-BM-4103
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 612 1 FIELD 19D,21D, 7D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

STUDIES ON AMMONIUM NITRATE-WATER SLURRY EXPLOSIVES

N. E. HANNA, R. L. GRANT

INT-BM-3273-C
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INTERIOR-BUREAU OF MINES

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ZUG 615 1 FIELD 19D,21D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

GALLERY INVESTIGATIONS OF PERMISSIBLE EXPLOSIVES

N. E. HANNA, P. A. RICHARDSON

INT-BM-3273-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 616 1 FIELD 7C,19D,21D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

INCENDIVITY OF DETONATING CORD TO FLAMMABLE GAS ATMOSPHERES

N. E. HANNA, J. C. COOPER

INT-BM-3273-B
/66- /.

INTERIOR-BUREAU OF MINES

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ZUG 724 1 FIELD 20C, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

INITIATION OF CONDENSED PHASE DETONATION BY GAS PHASE DETONATION

E. L. LITCHFIELD, M. L. WEISS

INT-BM-3273-O
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 725 1 FIELD 20C, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

ELECTRICAL INITIATION OF DETONATION

E. L. LITCHFIELD, M. H. HAY

INT-BM-3273-P
/66- /

INTERIOR-BUREAU OF MINES

20 PHYSICS

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GH 37 3 FIELD 11G,20K

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

THE EFFECT OF NON-LINEAR MATERIAL PROPERTIES ON THE STRESS DISTRIBUTION IN THIS SPHERICAL SHELLS

E. P. POPOV

NASA-NSG-274-E-5
6/65-.5/66

NASA

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GH 495 2 FIELD 5A,20L

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF SUPER-CONDUCTIVITY

M. H. COHEN

NASA-NSG-352-P-1
3/65- 2/66

NASA

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GH 644 1 FIELD 11F,11G,20L

UNIVERSITY OF DENVER, SCHOOL OF ENGINEERING, METALLURGY, COLORADO

THE RELATIONSHIP BETWEEN THE THERMIONIC WORK FUNCTION OF REFRACTORY METAL INTERMETALLIC COMPOUNDS AND THEIR STRUCTURES

D. T. KLODT

NASA-NSG-365-E-4
6/64- 2/65

NASA

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GH 610 2 FIELD 22C,22+,20M, 9+

UNIV OF ALABAMA, SCHOOL OF ENGINEERING, AEROSPACE ENGINEERING, ALABAMA

RESEARCH IN THE AEROSPACE PHYSICAL SCIENCES

R. HERMANN, B. R. CHOUDARY, H. CHU
J. C. DOWDLE, R. DUERR, W. R. GARRETT
M. A. GERAGHTY

NSG-381
3/65- 2/66

NASA

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GH 974 5 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

INVESTIGATION OF THE FLOW AND HEAT TRANSFER CONDITIONS WITHIN SEPARATED FLOW REGIONS

H. H. KORST, A. L. ADDY, E. L. BALES
W. L. CHOW, R. H. HOWELL, R. A. WHITE
P. S. YEH

NASA-NSG-13-E-3
3/65- 2/66

NASA

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GH 1022 3 FIELD 14B,20D

JSOC, NATL BUR STAN, DIST OF COLUMBIA

CONDUCT INVESTIGATION OF THE MECHANISM OF TRANSITION FROM LAMINAR TO TURBULENT FLOW IN BOUNDARY LAYERS IN BOTH SUBSONIC AND SUPERSON

G. B. SCHUBAUER, P. S. KLEBANOFF
V. E. MEASE, H. L. PERRY, W. R. ROWLAND
L. M. SARGENT, W. SPANGENBERG

R-51
10/64- 9/65

NASA

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GH 1181 1 FIELD 20M,20C, 5A

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, KANSAS

STUDIES IN ELECTROCALORIC EFFECTS IN FERROELECTRIC SUBSTANCES

G. G. WISEMAN

NASA-P-1-NSG-975
9/65- 2/66

NASA

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GH 1230 1 FIELD 7D,20M,20J,20D

RENSSELAER POLYTC INST, NEW YORK

SPATIAL NUCLEATION AND CRYSTAL GROWTH

J. B. HUDSON

NASA-E-3-NSG-663
6/65- 5/66

NASA

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GH 1240 1 FIELD 11F,13H,11G,12A

OLD DOMINION COLLEGE, UNDERGRADUATE SCHOOL, PHYSICS, VIRGINIA

DEFECT ANNEALING IN IRRADIATED SEMICONDUCTORS

W. M. PRITCHARD

NASA-E-4-NSG-602
4/65- 3/66

NASA

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GH 1602 FIELD 11G,11F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

EFFECT OF REPEATED STRESS REVERALS ON CREEP DEFORMATION

J. MORROW, G. R. HALFORD
P. A. LILLIENTHAL

/65- /

NASA

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GH 1604 FIELD 20M,11G,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

RADIANT HEAT EXCHANGE FOR NON-GRAY NON-DIFFUSE SURFACES IN A SPACE ENVIRONMENT

R. G. HERING, A. F. HOUCHENS

/65- /

NASA

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GPF 932 FIELD 7D, 7C,20M,20F

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, WISCONSIN

RADIATION INTERACTION IN SOLIDS - SURFACE AND HIGH PRESSURE EFFECTS

C. W. MAYNARD, G. SANDNESS, H. SCHMIDT
W. F. VOGELSANG

AT(11-1)1439
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

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GPF 186 6 FIELD 11F,11G

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, CALIFORNIA

EFFECT OF POINT DEFECTS ON MECHANICAL BEHAVIOR OF CRYSTALLINE SOLIDS

J. D. SHEABY, F. C. CLINARD, D. MERZ
J. PERRIN, O. C. SHEPARD

AT-04-3-326-2
10/65-.9/66

AEC-DIVISION OF PHYSICAL RES

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GQA 21 2 FIELD 13B,12A,13M,20D

FRANKLIN INSTITUTE, PENNSYLVANIA

HEAT TRANSFER IN COARSE FILTER BEDS

G. P. WACHTELL

OCD-OS-63-131
/65- /

DOD-ARMY

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GQA 230 1 FIELD 20M,20F,20L

ELECTRODYNAMICS OF MOVING MEDIA

L. J. CHU, L. M. CHU, H. HAUS
P. PENFIELD

DA-36-039-AMC-03200E
/65- /

DOD-ARMY

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GQA 301 1 FIELD 20M,20J,20F,20D

PHYSICAL ELECTRONICS - SURFACE PHYSICS

R. E. STICKNEY

DA-36-039-AMC-03200E
/65- /

DOD-ARMY

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GQA 312 1 FIELD 5A,20F,20D,20L

SOFT X-RAY SPECTROSCOPY OFSOLIDS

G. G. HARVEY, G. M. HARVEY

DA-36-039-AMC-03200E
/65- /

DOD-ARMY

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GQA 330 2 FIELD 20D,10B

CLEMSON UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, SOUTH CAROLINA

A STUDY OF SPLITTER EFFECT IN CONICAL DIFFUSERS

T. YANG

DA-31-124-ARO-D-148
/65- /

DOD-ARMY

****

GQA 337 FIELD 20K

OKLAHOMA STATE UNIV, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, OKLAHOMA

AN INVESTIGATION OF THE STRESSES AND DISPLACEMENTS IN THREE MONOLITHIC SEMIMONOCOQUE SKIN PANELS UNDER MECHANICAL LOADING

R. E. CHAPEL

DA-31-124-ARO-D-235
/65- /

DOD-ARMY

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GQA 338 1 FIELD 11G,11D,12A

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, PENNSYLVANIA

MECHANICS OF HETEROGENEOUS MEDIA

Z. HASHIN

DA-31-124-ARO-D-194
/65- /

DOD-ARMY

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GQA 349 1 FIELD 20M,20D, 5A,20L

YALE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, CONNECTICUT

LOW TEMPERATURE PHYSICS

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SURFACE ENERGY EFFECTS IN SLIDING PHENOMENA

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D. MARGOLIS

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THE DYNAMIC RESPONSE OF VARIOUS MEDIA

M. ANLIKER

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FIELD-DEPENDENCE OF NUCLEAR SPIN RELAXATION

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ELECTRONIC PROPERTIES OF ORGANIC SEMICONDUCTORS

G. WARFIELD

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PERFORMANCE AND FLOW REGIME DATA IN CONICAL DIFFUSERS OVER A WIDE RANGE OF SUBSONIC MACH NUMBERS

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TRANSIENT COOLING OF A SPHERICAL MASS OF HOT GAS BY THERMAL RADIATION DURING EXPANSION

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COMPUTATION OF LAMINAR COMPRESSIBLE BOUNDARY LAYER

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AERODYNAMICALLY GENERATED SOUND

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MASS TRANSFER COOLING IN HYPERSONIC FLOWS

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BASIC STRUCTURES AND STABILITY OF TURBULENT SHEAR FLOWS

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21 PROPULSION AND FUELS

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RESEARCH ON SUPERSONIC COMBUSTION OF HYDROGEN FOR MACH 10 VEHICLE

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SERVICES TO MAINTAIN AND OPERATE VARIABLE PARAMETER ROCKET MOTORS

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LIQUID PROPELLANT ROCKET MOTOR COMBUSTION PROCESSES

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IGNITION AND BURNING OF SOLID PROPELLANT

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DISTRIBUTION OF ENERGY IN THE PRODUCTS OF FLAMES

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HYBRID COMBUSTION AND FLAME STRUCTURES

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EXTINCTION OF BURNING PROPELLANT BY PRESSURE DECREASES

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FOURTH SYMPOSIUM ON ADVANCED PROPULSION CONCEPTS

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COMBUSTION IRREGULARITIES OF SOLID PROPELLANTS

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GROWTH OF BURNING TO DETONATION IN LIQUIDS AND SOLIDS

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REMOVAL OF PYRITIC SULFUR FROM COAL BY CHEMICAL AND/OR PHYSICAL TREATMENT

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PENETRATION OF SPACE VEHICLE STRUCTURAL MATERIAL AND SHIELDING BY HIGH ENERGY RADIATION

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HIGH PRECISION GEOCENTRIC INTERPLANTARY ORBITS

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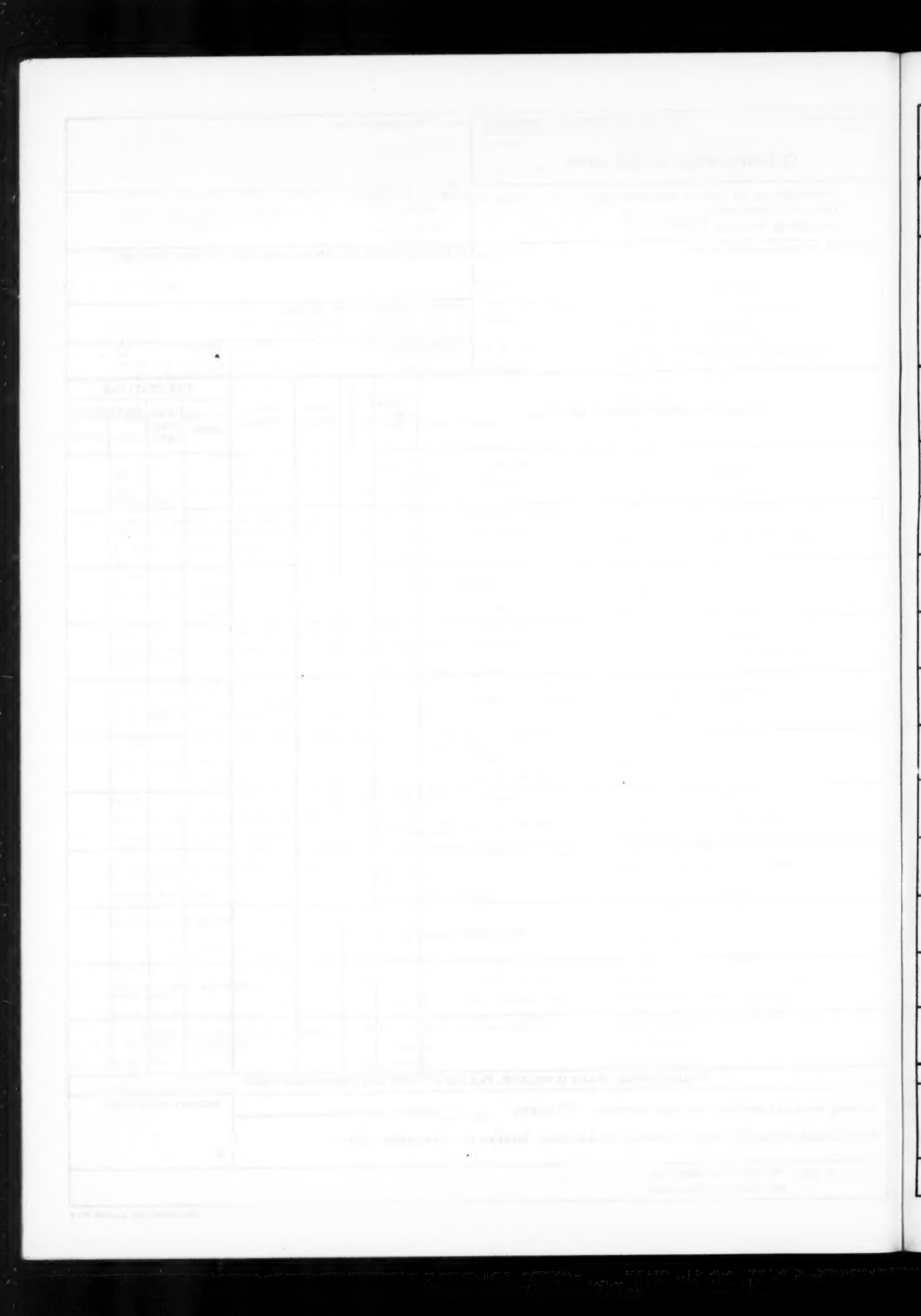

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